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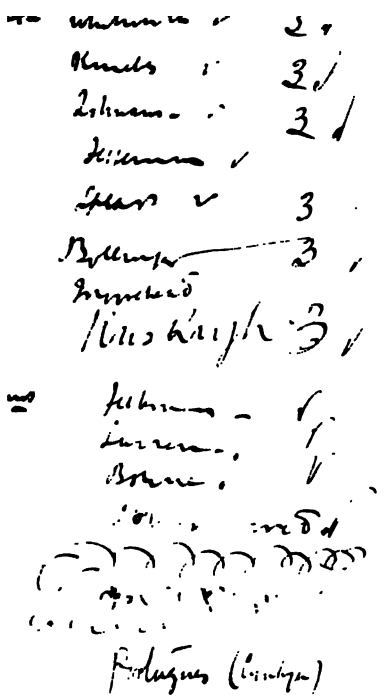

The Standard Medical Manual:

A Hand-Book of Practical Medicine.

BY

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TO MY FATHER,
REV. STEPHEN BURDICK,
THIS BOOK IS
MOST AFFECTIONATELY DEDICATED.

PREFACE.

In spite of its name this book does not assume to be or hope to become the "standard" one on the practice of medicine. The name is rather due to the author's editorial connection with the Medical Standard. In reviewing constantly the enormous mass of collateral medical literature which comes to his table in that connection he has found so much of real practical value that it seemed to him worth the while to collect some of the best of it in a volume of moderate size, giving in brief the most important facts concerning the etiology, pathology and symptomatology of the diseases treated, but dwelling with special detail and fullness upon the subject of treatment. In order to secure completeness and accuracy the principal works on general and specialized medicine have been freely consulted and utilized, while hundreds of journal articles have been read and the practical ideas found in them embodied in the book so far as possible in a volume of moderate size. The work is, confessedly, in large part a compilation, though the author's experience and judgment have been largely drawn upon in many instances. He has hoped to make it a thoroughly practical book—one which will be found a real help in the everyday work of the average practitioner. Little attention is therefore given to theories and no attempt has been made at "fine writing;" it has beenthe effort to present the facts in as few words as is consistent with reasonable clearness.

Since it is plainly impossible to cover the whole field of medicine in anything like a satisfactory way in such a work, the unusual diseases and those belonging naturally to the domain of the specialist are either omitted entirely or discussed very briefly. Most space is given to the diseases with which the practitioner has most to do, such as tuberculosis, typhoid fever,

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diphtheria, scarlatina, pneumonia, etc. A good deal of attention is also given to the minor ailments which make up so large a bulk of the physician's practice and yet are hardly mentioned in most text-books and seldom taught in medical schools.

No apology seems necessary for the large number of prescriptions introduced. While it is not expected or desired that the physician should make verbatim use of these, yet it is undoubtedly true that the study of carefully written prescriptions helps to impress upon the student the methods of giving drugs successfully and the advantages to be derived from their proper combination, as nothing else can—except the actual employment of such combinations, duly modified to meet individual requirements, in actual practice. It has been said that "prescription writing is a lost art." This is due, in part at least, to neglect of the study of therapeutic agencies and the small space given to detailed description of the use of remedies in many text-books, to which physicians quite generally go for guidance and help long after their college days are over. The medical journals are full of valuable suggestions, but these are unfortunately unavailable for ready reference in most cases. If the Standard Medical Manual contributes something to a gospel of therapeutic positivism, thereby making up something of this deficiency, the author will feel that it was not written entirely in vain. He has also tried to emphasize the importance of diet, hygiene, hydrotherapy and other "physiological" methods of treatment.

The articles have been arranged alphabetically in order to make the book more available for ready reference. In the appendix simple directions have been given for the examination of urine, analysis of stomach contents and the recognition of the common bacteria; and a variety of other subjects of medical interest are also treated. The epitome of the National Formulary which appears in this part of the book has been re-classified according to therapeutic uses so as to make it more useful to physicians. It is to be hoped that this valuable collection of formulas may be more generally employed—as it deserves to be. For permission to reprint the epitome I am indebted to the Council of the American Pharmaceutical Association and

especially to its president, Mr. W. S. Thompson of Washington, D. C., and its secretary, Geo. W. Kennedy, of Pottsville, Pa.

I wish especially to acknowledge my obligations to Dr. W. F. Church, who very kindly prepared most of the articles dealing with diseases of the throat and diseases of the heart; also to Dr. F. C. Zapffe, who wrote the article on bacteriology for the appendix and critically examined the page-proofs of the book; Dr. W. S. Gottheil of New York, who furnished some excellent illustrations of skin diseases; and Prof. C. S. N. Hallberg of the Chicago College of Pharmacy and Mr. A. G. Vogeler of the Western Druggist for numerous hints and criticisms.

Chicago, September 1, 1901.

THE STANDARD MEDICAL MANUAL.

ABORTION.

DEFINITION.—In this country the term abortion is applied to the premature termination of gestation when occurring during the first three months of pregnancy. From the fourth to the seventh month it is called miscarriage; when occurring from the seventh month to normal term it is denominated premature delivery. Continental writers usually apply the term abortion to the expulsion of the product of conception during the first six months of pregnancy, or before the period of viability.

ETIOLOGY.—Among the causes may be mentioned depressed vitality, physical weakness; constitutional disease, as syphilis or tuberculosis, occurring in either parent; many acute or general diseases, as typhoid fever, pneumonia, malaria, the exanthemata, etc.; sexual excesses, especially soon after marriage; physical or moral shock; over-exertion, excessive exercise, blows, or other traumatisms; uterine displacements, subinvolution, cervical lacerations, fibro-myomata, and other diseases of the uterus or its appendages.

METHOD OF EXPULSION.—During the first three months of pregnancy the ovum is usually expelled entire. If rupture occurs at this period, induced or criminal abortion should be suspected. After the third month the membranes are usually ruptured, and embryo and secundines expelled separately. The placenta usually follows the embryo within fifteen minutes to one hour; if delayed for four hours or more it is said to be retained.

SYMPTOMS.—When occurring during the first two months of pregnancy, the symptoms consist of hemorrhage, cramp-like pains (not unlike severe menstrual pains), and pain in the back. The true condition is often not recognized. After the third month the pains resemble those of normal labor, the cervix is open and soft, the hemorrhage is more profuse and, as dis-

tinguished from that of dysmenorrhea, usually precedes the pains.

Examination will determine whether or not the abortion is inevitable. If the membranes are ruptured, the fetus dead, or the ovum engaged in the cervix, it is pronounced inevitable.

TREATMENT.—In threatened abortion, absolute rest in bed should be required. Opium in some form should be given to arrest the uterine contractions, preferably morphin ¼ grain with atropin $^1/_{100}$ grain, hypodermically. The fluid extract of viburnum prunifolium given in one-half to one dram doses every two to four hours is a valuable uterine sedative. It may be given in a mixture with morphin, or with chloral hydrate and potassium bromid if opiates are contraindicated.

When it becomes apparent that abortion is inevitable, expectant treatment may be followed until nature has had a fair opportunity to complete the work, unless there are urgent symptoms requiring immediate interference. To check hemorrhage, place the patient in Sims' position and pack the vagina tightly with iodoform gauze, using extreme care to secure asepsis. Ergot may be given in dram doses every four hours. This method stimulates uterine contraction and usually effects removal of membranes and cessation of hemorrhage. If it fails, after the tampon has been in place a few hours, the application should be repeated. If it is still ineffective, the uterus should be thoroughly cleaned out under anesthesia, the os being freely dilated if not sufficiently patulous, the membranes hooked out with the finger where possible, and all decidual fragments carefully removed with the sharp curette. The uterus is now thoroughly irrigated with normal salt solution (.6 per cent) or bichlorid solution (1 to 5000).

Since the greatest danger in abortion is from sepsis, and retained membranes offer a favorable medium for the development of the septic process, many obstetricians now advocate immediate and complete removal of the uterine contents by the curette, when abortion has become inevitable. With surgical care as to asepsis, danger is reduced to a minimum.

In septic cases the dull curette is used, care being taken not to break down the natural barriers against infection thrown up by the leukocytes. The part is then irrigated with the

bichlorid solution and swabbed out with 95 per cent alcohol, or the following:

Iodin.....oz. 1
Carbolic acid.....oz. 1

ABSCESS.

DEFINITION.—An abscess consists of the formation of pus in a circumscribed cavity. This may occur in any organ or tissue of the body.

VARIETIES.—Acute and chronic. The former develops rapidly with more or less pain, heat, redness, swelling and elevation of temperature; the latter, the cold or tubercular abscess, develops gradually, without marked local symptoms. They are also classified according to location,—as alveolar, meningeal, cerebral, hepatic, lumbar, mammary, pectoral (empyema), dermal (boil or carbuncle), vulvo-vaginal, etc. They may be deep or superficial.

ETIOLOGY.—An abscess is the result of an inflammatory process, due invariably to infection with pus-producing or specific bacteria. These find entrance, usually, through some injury or abrasion of the skin or mucous membrane. Tubercle bacilli may find entrance to the circulation by the food or drink or by the inspired air. A secondary abscess may result from a septic inflammation in some other portion of the body.

PATHOLOGY.—Either staphylococci or streptococci are usually the infecting microörganisms. The former produce the milder and more local, the latter the more diffuse and dangerous inflammatory processes. The blood supply to the affected tissue is at first increased in rapidity; this is followed by dilatation of vessels, engorgement and slowing of the blood stream, with extravasation of leukocytes, plasma and red corpuscles. These fill the lymph spaces, become coagulated and are softened by the action of the cocci. The pus is composed of corpuscles, plasma and broken down tissue. Around the cavity thus formed leukocytes collect, and do battle with the microörganisms, new vessels are thrown out, connective tissue cells multiply and a protective zone of granulation tissue is formed to check bacterial invasion.

SYMPTOMS.—In an acute abscess the symptoms are (1) pain, due to compression of the nerves by the engorged tissues and

proportionate to the density of the affected part; (2) redness, due to distention of the blood vessels and escape of serum into the surrounding cellular tissue; (3) heat, throbbing, tension—mechanical results of increased blood supply; (4) fever, varying in intensity according to the location and the amount of general infection; (5) fluctuation, when pus is formed in appreciable quantity. Sharp pain on pressure over the apex of the swelling suggests the probability of pus being present.

In a chronic abscess the local symptoms are not marked, the pus formation finding its origin in a tubercular process, usually in the spine, hip-joint or lymphatic glands. There is no pain or local heat. Elevation of temperature is slight. Tenderness is slight. The general health is often affected, but the symptoms causing this are those attributable to the specific condition.

DIAGNOSIS.—In suspected abscess when fluctuation is detected, care should be taken to exclude the possibility of an aneurism. This is always found near a large vessel and is associated with expansile pulsation, synchronous with the beat of the heart, and the characteristic bruit. Occasionally a tumor growth, containing fluid, may be mistaken for an abscess. Aspiration of its contents will determine its character.

TREATMENT.—If the case is seen early an attempt may be made to arrest the formation of pus. Tincture of aconite, one to three drops, may be given every hour, or tincture of veratrum viride, one drop every hour, until the vascular tension is decidedly reduced. Calcium sulphid, in doses of $^1/_{10}$ to $\frac{1}{2}$ grain every hour, sometimes checks suppuration. W. F. Waugh (Alk. Clinic) gives it in grain doses at least seven times daily.

Locally, counterirritants may be applied, such as a solution of silver nitrate (30 grains to the ounce), or tincture iodin, painted on with a camel's-hair brush. Belladonna ointment or the following paste is useful to allay pain and prevent pus formation:

Ext. belladonna .....dr. 2
Glycerin .....oz. 1

Hot compresses are very effective in relieving pain. They should consist of sterile gauze, wrung out of a hot antiseptic solution, as 1 to 4,000 corrosive sublimate, or boric acid solution

(an ounce to a quart of water). These should be covered with oiled silk or dry towels to retain the heat and moisture.

As soon as the presence of pus has been determined, the abscess should be freely opened, the cavity thoroughly emptied and irrigated with corrosive sublimate solution (1 to 4,000). It is then lightly packed with moist iodoform gauze and a surgical dressing applied. In tubercular abscesses every care must be taken to secure perfect asepsis, on account of the danger of mixed infection.

ACNE; "PIMPLES."

DEFINITION.—Acne is an inflammatory disease of the sebaceous glands and the tissues immediately surrounding them, characterized by the eruption of unsightly crops of "pimples." These appear usually on the face, but also on the back, shoulders and chest.

VARIETIES.—According to the extent and severity of the eruption, the following varieties are recognized: Acne punctata, acne vulgaris or acne simplex; acne papulosa; acne pustulosa; acne indurata; acne atrophica; acne hypertrophica.

ETIOLOGY.—The cause may be a local one, as from lack of perfect cleanliness, the use of strong alkaline soaps, various cosmetics, too frequent or careless shaving, friction from hat-bands, too tight collars around the neck, and various irritants coming in contact with the skin. Usually, however, the disease first appears at the time of puberty when the growth of hair is most active, without apparent local cause. At this time disorders of other portions of the body act reflexly through the sensitive nerves supplying the skin and cause irritation of the hair follicles and sebaceous glands. Such disorders are those of the stomach and bowels, those of the genito-urinary organs, and neurasthenia and physical weakness. The most common cause is some form of indigestion. The exciting cause is probably bacterial, possibly from staphylococci, though Unna and others believe there is infection with a specific bacillus peculiar to the disease.

PATHOLOGY.—The focus of the disease is found in a plug of sebum or sebaceous glandular material, which blocks the follicular opening, serves as a culture medium for bacteria, becomes decomposed and irritant and causes inflammation of the sur-

rounding tissues. These sebaceous plugs are known as comedos or "blackheads," and are a necessary part of every case of acne. As a result of this inflammatory action a red, inflamed nodule or "pimple" is produced. This inflammation may subside entirely, may leave behind an indurated base from the overgrowth of connective tissue, or may terminate in suppuration and formation of a pustule, with more or less destruction of tissue.

SYMPTOMS.—The appearance of a crop of "pimples" is too well known to need special description. It varies in character from a few, distinct, inflammatory pin-head-sized points to an almost confluent pustular eruption of large nodules, perhaps as large as a pea, covering nearly the entire face; these may leave behind unsightly scars. It should be remembered that the comedo is an essential element of the disease.

PROGNOSIS.—Acne is a curable disease, but every case should receive careful study, and treatment must be prolonged and persistent.

TREATMENT.—The conditions to be met by treatment are defective nutrition of the cutaneous muscles and glands, an excessive sebaceous secretion, local irritability and inflammation, and probably bacterial infection. General tonic treatment is therefore necessary.

Hygiene and Diet.—Avoid local irritation of all kinds, dispense with cosmetics, and see that the skin is kept clean, using only the purest of toilet soaps. The patient should take plenty of exercise in the open air, eat only plain, nutritious food, avoiding especially all greasy articles of diet and hot bread or biscuit, cakes, pies, candies, jams, gravies, pickles, cheese, oatmeal, highly seasoned foods, alcoholic drinks and an excess of sweets.

General Treatment.—Few drugs have a specific influence on the course of the disease. Calcium sulphid, $^1/_6$ of a grain three or four times a day, is sometimes valuable in the indurated forms or those showing a tendency to suppuration. Ichthyol is sometimes a valuable remedy in these cases. It may be taken in pill or capsule, 5 to 8 grains three times a day, or as follows (Unna):

Ichthyol.....dr. 1—2
Distilled water.....dr. 5

15 to 50 drops in water morning and evening.

Leviseur has recently recommended the use of small doses of potassium iodid in the treatment of acne. Five grains are given three times a day in milk. This is continued until symptoms of iodism appear, consisting of a metallic taste, running from the nose, and a feeling of pressure in the frontal region. These symptoms appear sometimes after two or three doses and not later than the third day; they are slight and may escape notice. In addition, nodules appear in the apparently healthy skin and the acne lesions show increased inflammatory reaction. As soon as these symptoms have developed, the administration of the iodid is stopped and the face is treated locally with sulphur soap and a 10 per cent ichthyol ointment. After some days or weeks, the iodid treatment may be repeated.

A large percentage of the cases of acne present some digestive disorder. The nature of this should be carefully determined (see Gastric Neuroses) and receive appropriate treatment. Constipation should be corrected by careful regulation of habits and diet and the use of suitable aperients. Disturbances of the sexual apparatus, nasal fossæ or any other portion of the body capable of exciting sympathetic irritation should carefully be examined into and eradicated if possible. Anemia or chlorosis call for the use of arsenic and iron, remembering that acute inflammation contraindicates the use of arsenic. The following will be found effective:

Arsenous acid.....gr. 1
Mass. iron carbonate.....dr. 1½
Aloin .....gr. 6

Make twenty-four pills. One pill after meals.—Duhring.

Local Treatment.—The aims of local treatment are to remove the accumulated sebum, stimulate glandular activity and maintain the skin in an aseptic condition. The most efficient means of securing these results are found in the use of suitable soaps and very hot water. In mild cases it is often sufficient to wash the face with a good toilet soap and warm water; in sluggish cases, with the tincture of green soap.

After washing, the face should be rinsed with hot water and

steamed, or hot towels applied for ten minutes. After carefully drying, touch each spot with absorbent cotton moistened with a non-irritant antiseptic, as diluted alcohol, spirits of camphor or the following lotion:

Salicylic acid	gr. 10
Alcohol	oz. ½
Cologne water	oz. ½

This should be done every night, preferably just before retiring. In washing, use no sponges or wash rags. Bring only sterile gauze or cotton in contact with the face.

Most cases, however, require more energetic treatment. The following method may be used: Every night the face should be steamed or bathed in very hot water as already described. The "blackheads" are then carefully removed with a suitable comedo extractor, or carefully pressed out by thumb and finger between layers of gauze and the face rubbed for several minutes with a lather of some stimulating soap containing sulphur, creolin, resorcin or similar antiseptic. Sulphur is the most valuable constituent of these soaps. One containing sulphur and Peru-balsam is recommended by Walker. A valuable proprietary soap contains sulphur and birch tar. The lather should be wiped off after it has been in contact with the skin a few minutes; when the skin becomes sufficiently tolerant it may be allowed to remain. The continuous use of this soap causes considerable irritation, and it must be occasionally alternated with a sedative application. The face may be anointed with vaselin, cold cream, or the following:

Salicylic acid	gr. 15
Zinc oxid	dr. 3
Lanolin	dr. 6
Vaselin	dr. 12

—Brocq.

If a lotion is preferred, use the following:

Calamin	dr. 1
Glycerin	oz. 1
Lime water	oz. 1
Rose water	oz. 1

Sulphur is of all drugs the most valuable for local application in the treatment of acne. It may be employed not only in a soap but in the form of a lotion or ointment, as in one of the following formulas:

Beta-naphtol.....gr. 40
Precipitated sulphur.....gr. 200
Petrolatum .....gr. 100
Green soap.....gr. 100

Apply externally at night after the hot bathing.

Or—

Precipitated sulphur.....dr. 2
Potassium carbonate.....dr. 2
Glycerin.....dr. 2
Cherry laurel water.....dr. 2
Alcohol.....dr. 2

—Stelwagon.

As a rule, sulphur should be applied in greater strength than is usually employed. The following is good:

Lac sulphur.....dr. 10
Alcohol.....dr. 10
Acacia.....dr. 1
Water, enough to make.....oz. 4

On drying, this forms a thick powder and rapidly produces a scaling of the skin in most instances.

In the more inflammatory types of the disease, sulphur may be applied in a lotion with calamin, as follows:

Precipitated sulphur.....dr. 1
Calamin.....dr. 2
Zinc oxid.....dr. 1
Glycerin.....dr. 1
Water, enough to make.....oz. 4

Shake and paint on with brush.—Walker.

Resorcin is of special value when there is seborrhea oleosa—thus:

Zinc oxid.....dr. 1½
Resorcin.....dr. 6
Benzoated ointment, enough to make.....oz. 1

Ichthyol frequently makes a useful application in sluggish cases of acne. One of the following formulas may be used:

Ichthyol.....oz. 1
Water.....oz. 1

Rub in before retiring. Wash off with soap and warm water in the morning. During the day use a weak solution of mercuric chlorid.—Unna.

Ichthyol.....m. 30
Salicylic acid.....gr. 30

Soft soap .....gr. 18
Lanolin, enough to make .....dr. 4

Apply at night and wash off in the morning with hot water. —Eichhoff.

In a very bad case the patient should be confined to the house for three days, during which time he should wear a mask formed of mercurial plaster. The skin should then be cleansed with benzine and all pustules and comedos opened. This treatment should be repeated until no more pustules are formed, when Lassar's paste should be applied for a few days.—Sands.

ACNE ROSACEA.

DEFINITION.—Acne rosacea is a chronic eruptive disease of the face, characterized by hyperemia and redness, dilatation of the superficial blood vessels and more or less hypertrophy and acne.

VARIETIES.—Three forms have been described; first, the erythematous and telangiectasic; second, erythematous acne or true acne rosacea; third, hypertrophic acne, causing enormous enlargement of the nose, known as rhinophyma.

ETIOLOGY.—The first and second forms of the disease are more common in women. It may develop at puberty, but it is more usual after thirty years of age and has a greater tendency to appear at the menopause. Uterine or ovarian disturbances seem to predispose to its appearance. Among other causes, which are more prominent in men, are gastric and intestinal disturbances, exposure to heat and cold and, especially, too liberal use of alcoholic beverages. The characteristic red, bulbous nose of the hard drinker is a common illustration of the third or hypertrophic form of the disease.

PATHOLOGY.—The disease exists at first as a simple hyperemia. If this condition persists the vascular walls become paretic and permanently dilated. In the hypertrophic forms there is an associated enlargement of the glandular elements. There is also thrown out a network of new vessels.

SYMPTOMS.—The disease occurs usually on the nose or cheeks, but sometimes on the chin and forehead. The mildest variety appears as a simple red spot or patch. This may be purely temporary; if progressive, the presence of a network of dilated

capillaries is soon made evident. Acne lesions are often present and there is almost always more or less seborrhea. As the disease progresses, if the lesion is on the nose, that organ becomes enlarged, purplish-red, the capillaries more prominent and the glandular orifices dilated. In the most severe form it is increased enormously in size and covered with nodular tuberosities.

DIAGNOSIS.—The only diseases with which it is likely to be confounded are erythematous lupus and acneiform or tubercular syphilides. It may be readily differentiated from these by the location and arrangement of the skin lesion, the presence of seborrhea or crusts, the evident involvement of the sebaceous glands, the absence of ulceration or cicatrization and the history of the case.

TREATMENT.—*Hygienic and Dietetic.*—The cause should be sought for and corrected as far as possible by a proper adjustment of the habits and diet. Appropriate measures should be adopted to put the stomach and bowels in the best possible condition. Simple food should be selected and constipation cured by a suitable regimen. Tight collars or any constriction of clothing which prevents an equitable distribution of the blood supply should be forbidden.

General Treatment.—Internal medication, except that directly indicated by the etiological factors, is usually of little value. Various vasoconstrictors have been recommended, as quinin, ergot, belladonna and hamamelis. The following preparation is a useful formula of this class:

Quinin hydrobromid	gr. 30
Ergotin	gr. 30
Ext. belladonna	gr. 6-12
Lithium benzoate	gr. 30

Excipient and glycerin, a sufficient quantity.

Make forty pills. Two before each meal.—Brocq.

Unna recommends the internal use of ichthyol, given as recommended for simple acne. A tasteless preparation of this is ichthalbin, given as follows:

Ichthalbin	dr. 4
Saccharin (neutral)	gr. 2
Oil cassia	gtt. 2

Make twelve powders. One after each meal.

Local Treatment.—The local treatment is substantially the

same as that of acne vulgaris. The indications call for stimulating applications and the soap, hot water, friction and sulphur preparations should be used as already indicated. The sulphur may be used in the form of a soap, ointment or lotion, in various strengths to meet the degree of sluggishness of the disease and combined with the antiseptic and irritant drugs mentioned in the article on Acne. In cases of moderate severity Stelwagon recommends Vleminck's solution, applied diluted with one to ten parts water, gradually increasing its strength until used pure:

Lime	oz. ½
Sublimed sulphur	oz. 1
Water	oz. 10

To be boiled down to six ounces and filtered.

In the more obstinate cases good results are obtained by using green soap in conjunction with sulphur, naphtol or salicylic acid. This should be left in contact with the skin for several minutes. When the irritation becomes too great a sedative application may be made, as the following:

Salicylic acid	gr. 7
Zinc oxid	gr. 30
Bismuth subnit	gr. 30
Lycopodium	gr. 30
Vaselin	dr. 2
Lanolin	dr. 3

Ichthyol is also sometimes useful in these cases. The following may be tried:

Ichthyol	dr. 1
Bismuth subnitrate	dr. 1
White precipitate	dr. 1
Petrolatum	dr. 10

Apply at night.—Von Hebra and Ullman.

In hypertrophic cases the enlarged blood vessels should be destroyed. This can be very effectively done with the electrocautery. An equally effective way is to scarify them by multiple linear incisions, or, better still, draw the skin tight over the affected area and plunge the knife in, to a depth of about a sixteenth of an inch at a large number of points, until the entire affected area is honeycombed. This can be done very rapidly and without causing much pain. If the patient desires it the

affected area may be rendered anesthetic by the use of a refrigerating spray or Schleich's infiltration method.

ACROMEGALY.

DEFINITION.—An uncommon disease, characterized by hypertrophy and deformity of the bony skeleton.

ETIOLOGY.—Its cause is unknown. There is usually found an enlargement of the pituitary body; this is supposed to have some influence upon osseous nutrition.

PATHOLOGY.—The prominent feature in the disease is the bony deformity. This is manifested in the skull by hypertrophy of the external occipital protuberance, thickening of the frontal and occipital bones and enlargement of the maxillaries, the alveolar processes and zygomatic arch. The bones of the extremities are enlarged and elongated, producing sometimes a condition of giantism. The enlargement of the pituitary body has already been noted. The viscera also take part in the hypertrophic process; the heart is often greatly enlarged and the liver, kidney, spleen and nervous system present sclerotic and other changes.

SYMPTOMS.—The peculiar deformity is characteristic. The hands are thick and wide—spadelike—the fingers of nearly equal thickness at both ends. The hypertrophy of the feet is of the same character as that of the hands. The face is lengthened, the cheek bones and chin prominent, the jaw-bone enlarged, the nose increased in size and flattened, the lips thickened and the tongue enlarged. The dorsal convexity of the spine is often increased, the thorax distorted, thus interfering with the freedom of respiration. The muscles are usually atrophied, and there is general muscular weakness. Headache is an early symptom, and amenorrhea occurs early in women. The sexual functions are usually abolished. Cardiac hypertrophy and circulatory disturbances are common symptoms. Hunger and thirst are usually increased, and sometimes there is digestive trouble. The acuteness of the sensory organs—taste, smell, hearing and vision—is diminished, and various disturbances of sensation are reported. The skin is pigmented, dry and wrinkled, and the hair thick and harsh.

PROGNOSIS.—The disease is very chronic, slow in its progress,

lasting twenty to thirty years, but under present methods of treatment may be considered inevitably fatal.

TREATMENT.—Pituitary and thyroid extracts have been given with varying results, but without essentially modifying the course of the disease. Arsenic, iron and ergot have been tried and have occasionally done some good. On the whole, however, the treatment should be symptomatic, addressed to the relief of the trying symptoms, as pain and insomnia.

ACTINOMYCOSIS.

DEFINITION.—A parasitic disease due to infection with the actinomyces or ray-fungus.

ETIOLOGY.—The disease is commonly contracted from the food or drink, usually from barley or rye contaminated with the fungus.

PATHOLOGY.—The actinomyces are a species of cladothrix, belonging to the schizomycetes. Examined under the microscope the fungus is found to consist of an interwoven thread-like mass, from the periphery of which radiate club-shaped

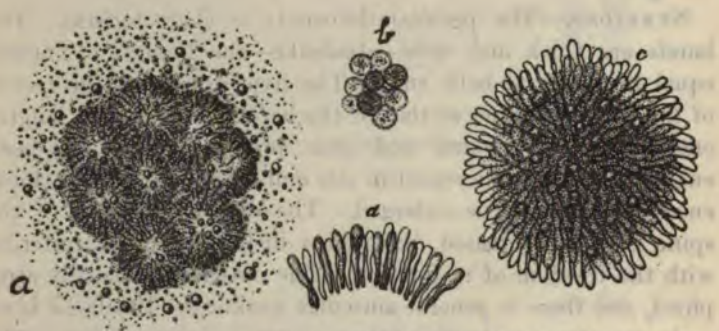

FIG. 1. THE RAY FUNGUS (*Poncet and Berard.*)

bodies or rays. The disease is usually chronic but the fungus may grow very rapidly, in a favorable situation, reproducing itself from spores derived from the filaments. Large tumor-like masses are formed consisting largely of granulation tissue and containing epithelioid elements and giant cells. These masses are very subject to secondary infection and often break down in an ulcerative process with the discharge of pus con-

taining the characteristic fungus grains, each about as large as a pin-head.

SYMPTOMS.—The symptoms are dependent upon the locality affected by the disease. Any portion of the body may be attacked. On the surface it appears as a tumor-like body which soon breaks through the skin, presenting a red, indurated mass, discharging purulent liquid, often stained with blood. The disease may appear in decayed teeth or on the tongue. Its most common location is along the lower jaw, extending into the loose tissues of the neck. Here, as elsewhere, there is early softening, edema and trismus. In the intestinal canal the principal symptom is pain, simulating chronic peritonitis. In the bronchial tubes and lungs it causes symptoms simulating chronic bronchitis, bronchopneumonia and tuberculosis. The affection is more severe in summer and tends to attack the lower lobes. Wherever the location, the disease may be absolutely diagnosed if the characteristic fungus can be obtained for examination.

PROGNOSIS.—The prognosis is serious and its gravity proportionate to the rapidity of suppuration. Internal actinomycosis is usually fatal owing to inaccessibility. In a favorable location surgical treatment will usually be successful in effecting a cure.

TREATMENT.—Potassium iodid given in large doses has been found useful in many cases and should be given a thorough trial where complete extirpation is not possible. Cauterization with the solid stick of silver nitrate has been recommended. If possible to do so the tumor should be removed entire, before suppuration; after suppuration the diseased tissues should be thoroughly curetted and the cavity packed with iodoform gauze.

ADDISON'S DISEASE; SUPRARENAL DISEASE.

DEFINITION.—An unusual systemic disease, characterized by anemia, asthenia and a peculiar pigmentation of the skin.

ETIOLOGY.—The disease is believed to be primarily due to some disturbance of function of the suprarenal gland. Predisposing causes are physical or nervous exhaustion and faulty nutrition resulting from improper hygiene or diet.

PATHOLOGY.—Almost constant pathological changes are the deposit of pigment in the Malpighian layer of the skin and degenerative changes in the suprarenal gland. The lesion in the

latter is usually tubercular, though inflammatory conditions or tumor growths may cause the same symptoms. Next to these in frequency are changes in the structure of the sympathetic ganglia, especially in the neighborhood of the suprarenals. In a small percentage of cases organic changes of these glands have not been determined. The exact function of the suprarenals is still a matter of discussion. It is generally believed, however, that they have an excretory office in disposing of toxic products, especially of degenerated red corpuscles. Others ascribe to them a secretory function—elaborating something essential to the bodily economy.

SYMPTOMS.—The earliest symptoms are loss of strength, a sense of weariness, cardiac weakness and palpitation, dyspnea, pain in the region of the heart, digestive disorders, and anemia. These are followed by or associated with a characteristic bronzing of the skin, appearing first in spots or blotches, usually on the face and backs of the hands, but gradually invading other portions of the body until nearly the whole surface may be covered. In addition to the above, the nipples, axillæ, genitals and points of friction are places of selective intensity for the pigmentary process. The palms of the hands and soles of the feet generally remain white. The color is at first a light brown or bronze, but as the disease progresses the shade deepens until the patient may take on a mulatto-like bronze.

PROGNOSIS.—The disease is prolonged in its course and usually fatal, but recent innovations in treatment give promise of more favorable results, in rare cases at least.

TREATMENT.—Treatment has usually been found very unsatisfactory and has been addressed largely to relief of the symptoms. N. S. Davis (Sajous' Cyclopedia), on account of the usual tubercular origin of the disease, recommends nuclein and creosote. The value of the latter will be increased by giving it in capsules with the addition of $^1/_{30}$ grain of strychnin to each dose. Arsenic, given in large doses, in the form of Fowler's solution, is undoubtedly valuable. The suprarenal capsule seems to be the most promising remedy. Excellent results and even cures have been reported from its use. Kinnicut (Am. Jour. Med. Sci.) collected reports of forty-eight cases treated with it. Of these six were apparently cured, twenty-two improved, eighteen unim-

proved and two worse. It is most conveniently given in the dry extract, commencing with 2½ grains in capsules or tablets, three times a day, gradually increased to double this amount.

ADENITIS.

DEFINITION.—Inflammation of a gland. The term is usually applied to inflammation of the lymphatic glands.

VARIETIES.—It may be acute or chronic.

ACUTE ADENITIS.

ETIOLOGY.—Predisposing causes are such as undermine the resisting power of the gland. It may follow overexertion or result from systemic debility. The exciting cause is found in the presence of irritants or bacterial poisons. It is usually secondary to inflammation or sepsis in an adjoining or tributary portion of the body,—as from lymphangitis, infected wounds, gonorrhea, carbuncle, erysipelas, and the various contagious and infectious diseases.

PATHOLOGY.—The progress of the disease is dependent upon the kind of infection and the degree of inflammation. It may stop short of suppuration, the gland becoming swollen and hard, with minute foci of hemorrhage, dilated vessels, arrest of the lymph current and exudation of serum and white corpuscles into the stroma of the gland; or, as is usually the case, the gland softens and breaks down into suppurative foci, which subsequently unite to form an encapsulated abscess. This may open externally or into the surrounding cellular tissue. There is often considerable periglandular inflammation. The process may leave behind a chronic inflammation of the gland.

SYMPTOMS.—The symptoms are pain, heat and swelling. These are dependent in severity upon the location of the gland and the character of the surrounding tissue. When superficial the enlargement of the gland is readily recognized by palpation. Fluctuation is recognized only after considerable tissue destruction, on account of the multiple foci of suppuration. Periglandular inflammation makes the swelling more diffuse and the outlines of the gland less easily defined. When the inflammation is deep, diagnosis is even more difficult.

PROGNOSIS.—Usually favorable. Danger may exist when there

tincture of iodin or alcohol. In true tubercular cases these are probably ineffective. Hammerschlag uses injections of iodoform emulsion. This operation must be done under the strictest asepsis with the skin made tense and the glands prominent. Schleich's method of local anesthesia is used. One or two C'c. of a 5-per-cent sterilized solution of iodoform gylcerin-emulsion is injected once a week. If pus is present, this is first aspirated with the syringe and the iodoform injection made through the same opening. Morgan recommends treating locally that portion of the skin or mucous membrane drained by the diseased gland, which is probably the point of entrance of the infection. He applies the following to the tonsils, naso-pharynx, etc., as indicated:

Iodin	gr. 12
Potassium iodid.	gr. 15
Oil peppermint	m. 2
Glycerin	oz. 1

If applied before softening has taken place he has found this very effective.

Schleich gives iodid of potash internally and uses the following paste, as a local application in cases of inflammatory hyperplasia without suppuration:

Dried pepton	gm. 15
Powd. starch	gm. 15
Zinc oxid.	gm. 15
Acacia	gm. 15

Reduce to a fine powder. Add distilled water to make a soft paste and add:

Lysol	gm. 3
Oil melissa	gm. 3

With this 30 gm. metallic mercury are extinguished in a mortar and 10 gms. of the mixture diluted with water applied with a brush and allowed to dry.

If in spite of constitutional and local treatment the glands increase in size and show signs of suppuration, they must be extirpated.

ALCOHOLISM.

DEFINITION.—The various results produced by the excessive or prolonged use of alcoholic beverages.

VARIETIES.—Alcoholism may be acute or chronic. Following

the classification of Norman Kerr we speak of (1) Acute Alcoholic Intoxication or Drunkenness; (2) Acute Alcoholic Delirium, or Delirium Tremens; (3) Acute Alcoholic Mania, or Mania a Potu; and (4) Chronic Alcoholism, or Habitual Drunkenness.

PATHOLOGY.—Locally alcohol produces a sense of heat and acts as a mild astringent. It coagulates albumin and inhibits the action of the gastric juice if taken in quantity. A small amount stimulates the appetite and digestion. It accelerates but does not increase the strength of the heart and by its inhibitory action on the vaso-motor nerves causes vascular dilatation, with a sense of warmth and comfort, slight perspiration, a greater flow of urine and increased secretion of the mucous glands.

Alcoholic excess causes an intense irritation of the stomach, excessive secretion of mucus, and nausea and vomiting. This irritant effect is evidenced in the kidneys, by the increased flow of urine and occasionally by its suppression. Alcohol disturbs nervous nutrition, causing in the end degeneration and atrophy of the nerve cells, dendrites and terminal fibres. It seems to check the activity and destroy the function of the leukocytes making the organism less competent to cope with disease. It diminishes the oxygen carrying power of the red cells and prevents the free exchange of gases in the lungs, thus favoring the retention of toxic elements in the body.

Chronic alcoholism causes various diseases of the viscera. In the stomach it causes passive congestion, local ulceration, atrophy of the gastric glands, increase of connective tissue and enfeebled digestion—a condition of chronic gastric catarrh. The liver often becomes diseased. Cirrhosis in some form is most common, the hobnail liver being characteristic of spirit drinkers. Nephritis is a natural sequence of the prolonged irritation of the kidneys. This is especially common in beer drinkers. The heart muscle becomes weakened, the blood-vessels atheromatous and the respiratory system weakened. The degeneration of cerebral nerve centers of chronic alcoholics not infrequently terminates in dementia

ACUTE ALCOHOLIC INTOXICATION; DRUNKENNESS.

SYMPTOMS.—The symptoms of alcoholic intoxication are too well known to need any special description. Three stages may be

recognized. First, one of exhilaration, when there is a quickening of the mental faculties, excitement, energy, talkativeness, with vascular relaxation and flushing of face; second, a stage of incoordination, with mental incoherence, exaggeration and distortion of ideas, emotional manifestations expressed in silly, sentimental or quarrelsome words or acts, thickness of speech and unsteadiness of gait; third, "dead drunkenness," with complete unconsciousness, mental and physical oblivion, feeble circulation, coldness of extremities and pallor of face.

DIAGNOSIS.—In the last stage of intoxication the condition may simulate diabetic or uremic coma, from either of which it may be differentiated by a urinary examination. In opium poisoning there are the pin-point pupils; in belladonna poisoning pupillary dilatation; in apoplexy there is usually deeper coma, stertorous breathing and hemiplegia. In epilepsy there is a history of the characteristic convulsions. It should be kept in mind to avoid mistakes of diagnosis that the smell of liquor on the breath is not evidence of intoxication and that intoxication may co-exist with some more serious condition.

TREATMENT.—Further indulgence in alcoholic drinks must be stopped at once. Wash out the stomach with the tube if possible or induce vomiting by a large draught of tepid water, a dram of fluid extract of ipecac or a hypodermic injection of apomorphin ($^1/_6$ to $^1/_8$ grain). When the stomach is unloaded sleep usually follows and further medication is unnecessary. In the early stages it is often desirable to procure rapid elimination. This may be secured by a quickly acting laxative, as Epsom or Rochelle salts or Hunyadi, Apenta or other natural aperient water, and thorough diaphoresis with the Turkish or other vapor bath. If emesis has already occurred the stomach may be settled by the administration of milk and carbonated water, as Apollinaris, or lime or barley water. If there is much depression a little cinnamon or aromatic spirits of ammonia (10 to 15 minims) may be added. Often the cold bath with friction has a decidedly bracing effect.

Medicinal treatment often aids in restoring the patient. The following combination is a useful stimulant and sedative:

Arom. spt. ammonia .....dr. 2
Spirits camphor .....dr. 1½

Tinct. hyoscyamus .....dr. 2½
Comp. spt. lavender, enough to make.....oz. 2

One teaspoonful every hour.

The bromids and chloral are indicated if nervous excitement, irritability and insomnia are troublesome symptoms.

Sodium bromid. .....oz. ½
Chloral hydrate .....dr. 2½
Syrup orange .....oz. ½
Water, enough to make.....oz. 4

A teaspoonful to a dessertspoonful every 2 to 4 hours, as necessary.

DELIRIUM TREMENS.

Symptoms.—The approach of an attack of delirium tremens may be insidious—marked only by the patient's unusual nervousness, irritability, tremor, insomnia, melancholia and increased disturbance of the digestive organs with complete anorexia; or it may come on entirely without warning, the climax being precipitated by an unexpected physical shock or injury, perhaps very slight in character. In an attack of delirium tremens there is complete loss of mental control. The patient becomes wildly delirious, talks incessantly and incoherently and cannot be persuaded to remain still for a moment. In his countenance, in every movement and word, he gives expression to the most intense dread and horror. He is pursued by hallucinations of snakes, rats, and other repulsive reptiles and is constantly trying to escape from frightful objects which he imagines pursue him. His pulse is rapid, feeble and irregular; the expression of the eyes, wild and vacant; the pupils contracted and the muscles in constant tremor. Insomnia is continuous.

Prognosis.—The prognosis is good in an uncomplicated case, the period of delirium usually terminating in natural sleep. Not infrequently, however, the patient becomes comatose and death results. The Philadelphia Hospital records a mortality of about 10 per cent. If drinking is resumed recurrence is likely to follow.

Treatment.—In a case of delirium tremens the supply of alcohol should be cut off at once, unless there are special indications for its continuance, as when the attack occurs in the course of an acute disease, such as pneumonia, or in old or feeble

individuals long habituated to its use. Where possible, without using undue force the patient should be kept in bed. Strapping to the bed should never be attempted; sometimes sufficient restraint may be obtained by a strong sheet or blanket carefully fastened at either side. Discreet attendants are better and can offer sufficient restraint to prevent injury. The padded room, or d. t. cage is seldom available.

The debilitated and exhausted condition of the patient demands the administration of food. Milk is the most valuable and may be given hot with 10 to 15 minims of tinct. capsicum every three or four hours. Hot soups, beef tea or any of the prepared foods may be given in the same way. The capsicum is a useful stimulant and gastric sedative. Food may be given through the stomach tube if necessary. To secure sleep and quiet the patient's delirium, chloral and potassium bromid are the most useful drugs, and may be given in large doses, having in mind, however, the danger of depressing an already feeble heart. A good combination is the following in use at the Bellevue Hospital:

Potassium bromid	oz. 1
Chloral	dr. 4
Tinct. digitalis	oz. 1
Tinct. capsicum	oz. 1
Tinct. ginger	oz. 1
Arom. spt. ammonia	oz. 1
Syrup orange	oz. 1
Distilled water, enough to make	oz. 8

Tablespoonful every 3 hours.

Other prescriptions of this character are the following:

Chloral	dr. 4
Potassium bromid	dr. 4
Tinct. hyoscyamus	dr. 4
Chloroform water, enough to make	oz. 4

Dessertspoonful every 2 hours until quiet or 3 doses are taken, then every 4 hours as required.—Jour. A. M. A.

Or—

Chloral	dr. 2½
Potassium bromid	dr. 5
Syrup orange-peel	dr. 2½
Water, enough to make	oz. 6

Tablespoonful every 2 to 4 hours as indicated.—Edes.

In cases of cardiac weakness aromatic spirits of ammonia or

digitalis may be given internally or strychnin, $^1/_{30}$ grain, hypodermically, or a syringeful of camphorated oil, hypodermically. Elimination should be secured by suitable stimulation of the excretory organs, by free catharsis, diaphoretics in robust cases, and the hot bath. The latter has a sedative effect and decidedly assists in producing sleep. Enemas and gastric lavage may be found useful. After the active symptoms have subsided careful regulation of the diet and a bitter tonic may be prescribed.

MANIA A POTU.

SYMPTOMS.—This condition is commonly spoken of as "crazy drunkenness," a term which is descriptive of its symptomatology. After indulgence in liquor, often moderate in quantity, the patient is carried away by a wild, ungovernable fit of nervous excitement in which he wildly attacks any object or person which attracts his attention. He is not unconscious or delirious, but simply given up for the time being to an uncontrollable paroxysm of passion. The pulse is full and strong, the temperature normal and the face flushed. The attacks usually pass away in a few minutes, but may last several hours or recur from time to time.

TREATMENT.—As a rule the only treatment necessary is restraint during an attack and the withholding of alcoholic drinks. If the attacks persist, nausea and vomiting may be produced by hypodermics of apomorphin, $^1/_8$ to $^1/_6$ grain, resulting in the rapid relief of the symptoms; or large doses (30 grains) of potassium bromid may be given every two or three hours. This may be combined with chloral in severe cases.

CHRONIC ALCOHOLISM.

SYMPTOMS.—The symptoms of chronic alcoholism are dependent upon the degree of functional or organic derangement. Among them may be mentioned restlessness at night, insomnia, irritability, mental hebetude, dizziness and ringing in the ears. There may be and often are delusions, suspicions and apprehensions of personal injury. Muscular or nervous pains are common. The gait becomes ataxic and unsteady, the muscles tremulous, the eyes watery and bloodshot. Gastric catarrh occurs

comparatively early; nausea and vomiting are common and recurring in the morning are characteristic symptoms in the pronounced drunkard. The appetite is usually wanting at breakfast, the tongue coated and the breath foul. The chronic spirit drinker is emaciated, with flushed, red or bluish face and prominent distended capillaries. The drinker of malt liquor becomes abnormally fat and his face bloated and shapeless.

PROGNOSIS.—Under proper treatment alcoholism is curable, for it is essentially a disease of nervous origin as shown by Crothers, Remondino and others. According to Crothers, out of several thousand cases fully 35 per cent remained temperate after an interval of eight or ten years.

TREATMENT.—It is important to determine the cause before instituting treatment. The patient will almost always be found to be a neurotic, and mental fatigue, nervous or physical exhaustion, sexual excesses or similar causes may be found the determining feature in the case.

Withdraw all alcoholic stimulants at once. The indications for treatment are the restoration of the nutritive functions, the elimination of retained toxins and support of the debilitated nervous system. The digestive tract should be put in the best possible condition. Treatment may be commenced with a dose of calomel followed by a quickly acting saline cathartic, as Epsom or Rochelle salts, or the natural purgative waters. In severe cases, enemas and gastric lavage will be found of value. The diet should be simple and consist of easily digested food but as nutritious as possible.

To secure rapid elimination the hot bath is of the utmost value, the Turkish or hot vapor bath being the most satisfactory method for its employment. This is readily attainable with the number of cheap appliances of this kind now on the market. In the more debilitated cases this should be supplemented by massage and electricity. Light outdoor exercise should be encouraged. The most valuable single drug in the cure of alcoholism is strychnin. This must be given in large doses—$^1/_{30}$ grain of the sulphate or nitrate with atropin sulphate $^1/_{100}$-$^1/_{150}$ of a grain hypodermically every three hours for one or two weeks, then at longer intervals in larger doses. If preferred this or nux vomica, in somewhat larger doses, may be given by the

mouth. Dana uses the following stomachic mixture in the Bellevue Hospital:

Comp. tinct. cinchona	oz. 1
Tinct. capsicum	dr. ½-1
Tinct. horse-nettle	dr. 1
Bitter wine of iron, enough to make	oz. 4

Teaspoonful three times a day.

As the patient's condition improves the strychnin may be gradually withdrawn and iron added to combat any anemia that may exist. Cinchona, gentian, condurango or other bitter tonics are generally useful.

The "gold cures" are usually fallacious and their beneficial result dependent upon the degree of their mental influence upon the patient. The aim of most of these remedies is to produce a distaste for liquor. This can be effected by the hypodermic administration of small doses of apomorphin, sufficient in size to produce nausea. For the same purpose ipecac may be taken internally. Either of these remedies should be given with or about the same time as the regular allowance of alcohol. Carter says that small doses of atropin, less than $^1/_{100}$ grain three or four times a day, will produce a distaste for liquor. To overcome the craving Zedekauer recommends the following:

Decoct. althea	oz. 5
Chlorin water	dr. 2
White sugar	dr. 2

A tablespoonful every 3 or 4 hours.

The following formula is the type of a series quite generally used by different physicians:

Gold and sodium chlorid	gr. $^1/_{24}$
Strychnin nitrate	gr. $^1/_{60}$
Nitroglycerin	gr. $^1/_{100}$
Atropin sulphate	gr. $^1/_{200}$
Digitalin	gr. $^1/_{60}$
Sodium chlorid	gr. $^1/_{8}$

One tablet for hypodermic use, or in pill-form internally, three or four times a day.—Dunham.

ALOPECIA; BALDNESS.

DEFINITION.—Falling of the hair.

ETIOLOGY.—This occurs in the course of various acute diseases, especially in typhoid fever, scarlatina and erysipelas. It is

a very common symptom in syphilis. It is also caused by some local diseases, as eczema, lichen, pityriasis. It may be congenital or senile. Among the causes to which idiopathic baldness is ascribed are the pressure of hat brims upon the nutrient arteries of the scalp (the anterior temporal, posterior temporal and occipital) and shaving of the face, which acts as a counter-irritant and by increasing the growth of the beard deprives the scalp of nutrition. But undoubtedly the most common cause is seborrhea or dandruff; persistent falling of the hair is usually associated with this condition. Physical weakness and nervous debility are predisposing causes. It is often hereditary.

PATHOLOGY.—In uncomplicated alopecia there is a narrowing of the nutrient vessels of the scalp due to an endarteritis. This causes a diminished blood-supply to the hair follicles and the surrounding tissues, which causes their starvation. The hairs fall out and the epidermis becomes atrophic.

The pathology of alopecia is in most cases, however, that of seborrhea. This is, according to Sabouraud, a contagious disease caused by a micro-bacillus which lodges in the sebaceous follicle, causing an excessive glandular secretion, which accumulates about the opening of the hair follicle as greasy flakes or scales. The result is progressive papillary atrophy, as a result of which the hair usually becomes dry, brittle and lusterless, finally becomes loose and falls out.

TREATMENT.—When the general health is poor, tonic and nutritive treatment is indicated. The fats, especially in the form of cod-liver oil, are of great value. The cod-liver oil may be combined with the hypophosphites or maltine. Arsenic, iron and strychnin are most useful drugs. The following prescription is good, taken three times a day:

Strychnin sulphate .....gr. $^1/_{60}$
Reduced iron .....gr. 1
Quinin bisulphate .....gr. 1

For one capsule.

Pilocarpin is by some regarded of specific value; $^1/_8$ to $^1/_6$ grain of the hydrochlorid may be taken each night at bedtime or given hypodermically

Local Treatment.—In uncomplicated cases local remedies should be used in connection with suitable internal treatment to

increase the blood supply to the scalp and stimulate the activity of the hair follicles. They should always be applied with friction since massage is often the most valuable remedy. The following are fair examples of prescriptions of this class:

Quinin sulphate .....dr. ½
Tinct. cantharides .....dr. 1
Arom. spts. ammonia .....oz. 1
Castor oil .....oz. 1½
Bay rum .....oz. 5½
Oil rosemary .....gtt. 5

Rub into scalp.—Gerhard.

Or—

Tinct. cantharides .....dr. 1
Carbolic acid .....dr. 1
Castor oil .....dr. 1½
Bay rum .....oz. 2
Spts. lavender .....oz. 2

—Stevens

Or—

Tinct. cinchona .....oz. ½
Tinct. cantharides .....m. 15
Tinct. green soap .....m. 50
Balsam Peru .....m. 75
Oil bergamot .....oz. ½
Oil orange .....oz. ½
Oil rose geranium .....m. 15
Alcohol, enough to make.....oz. 4

Or—

Pilocarpin hydrochlorid .....gr. 1
Tinct. cantharides .....dr. 1
Cologne water .....oz. 1
Soap liniment, enough to make .....oz. 4

Apply to the scalp once daily.

In the great majority of cases the baldness is due to the coexisting seborrhea.

In all forms of alopecia massage will be found valuable. It is the treatment which does the most good, and much of the success attending local applications probably depends upon the vigor with which they are applied. While it can be given best by a professional masseur, the patient can manage it very well himself, if he tries. The scalp should not only be rubbed with the tips of the fingers, but should also be made to move back and forth upon the subcutaneous tissues. This should be done

five to ten minutes at a time every day. Brushing is a form of massage that every one may employ. Patients should be cautioned not to use brushes indiscriminately. In every family each individual should have his own brush—one in which the bristles are firm enough to make friction without tearing the surface.

The first indication to be met by treatment is therefore the removal of the dandruff. This may usually be effected by washing with any good toilet soap and warm water; tar soap is excellent. More severe cases require shampooing with tincture of green soap, using plenty of friction in order to stimulate the circulation. If the scalp is not inflamed and sensitive, it may, at first, be washed every day; later, when the scales have disappeared, once or twice a week will be sufficient. The period between washings may be further increased as the condition improves, but the least recurrence of dandruff demands its removal. Supplementary to the cleansing process is the alternate use of hot and cold water. The soap should be washed off in water as hot as can be comfortably borne and this followed by a cold douche, the scalp being rubbed meanwhile until it glows. This local hydrotherapy is based upon thoroughly physiological principles and is an important adjunct for the restoration of the vascular equilibrium. It is an excellent plan to employ it daily.

If the scalp becomes red and inflamed lengthen the intervals. In such cases or if there is eczema Gessner applies the following:

Ichthyol	m. 12
Zinc. oxid.	dr. 1
Starch	dr. 1
Petrolatum	oz. 1

Under this treatment all irritability rapidly subsides. In mild cases it may be sufficient. Usually however antiseptic applications are necessary. Lassar recommends, after washing, the use of a lotion consisting of one-half per cent corrosive sublimate in glycerin and rose water, followed by one-half per cent of beta-naphthol in alcohol, this followed by an ointment. These lotions are actively bactericidal. While they are useful in obstinate cases, one of the oily preparations may usually be immediately applied after removing the dandruff.

The drugs of greatest value are sulphur, salicylic acid and

resorcin. Robinson says resorcin is to be preferred when the hair is naturally oily, sulphur when it is dry. These may be used alone or in combination in lotions or ointment, the amount of oily material being adjusted according to its presence or absence in the scalp. Walker recommends the following:

Acid salicylic .....dr. 1-4
Castor oil .....dr. 2-6
Oil rose geranium.....m. 10
Alcohol, enough to make.....oz. 6

One or more drams of tincture of cantharides may be added if the stimulant quality is required. He recommends the following ointment:

Sulphur .....dr. 1—gr. 15
Acid salicylic .....dr. 1—gr. 15
Petrolatum ..... oz. 1

Other useful formulæ are:

Sulphur precipitat.....gr. 24-48
Resorcin .....gr. 12-24
Acid salicylic .....gr. 6-12
Tr. benzoin .....m. 12
Petrolatum .....oz. 1

Or— —Gessner.

Resorcin .....gr. 36-60
Chloral hydrat.....gr. 36-60
Acid tannic .....gr. 36-60
Tr. benzoin .....m. 12
Castor oil .....m. 36-60
Alcohol .....dr. 20

Or— —Gessner.

Resorcin .....dr. 1
Tinct. cantharides .....dr. 6
Alcohol .....oz. 1
Cologne water .....oz. 1
Water, enough to make.....oz. 6
—Walsh.

If the condition is an inflammatory one, moist or inclined to spread, Lassar's paste is a useful application.

Starch .....dr. 4
Zinci oxid. .....dr. 4
Petrolatum .....oz. 1

To this 15-30 grains of salicylic acid may be added with advantage.

A treatment recommended by Lassar, which is somewhat

tedious, is said to have been very effective in his hands. He proceeds as follows: Wash the head thoroughly for ten minutes with tar soap. Wash out the lather with plenty of warm water followed by cold water. Dry the hair and apply:

Mercuric chlorid	gr. 10
Glycerin	oz. 2
Alcohol	oz. 2
Distilled water	oz. 5

Follow this with—

Beta-naphthol	gr. 15
Alcohol	oz. 4

Rub this in till the hair is dry and then apply:

Salicylic acid	gr. 30
Tinct. benzoin	dr. 1
Neatsfoot oil	oz. 2

The whole process takes about fifteen minutes, and is to be repeated daily for a period of six weeks or longer.

ALOPECIA AREATA.

DEFINITION.—A disease of the hair, characterized by the appearance of circumscribed bald spots usually on the scalp, rarely on other portions of the body.

ETIOLOGY.—The disease is undoubtedly contagious. The direct cause is still a matter of controversy, but it is probably due to infection by a very small bacillus which is fairly constant in these lesions. By some authors the disease is considered a neurosis, resulting from overwork, shock, worry, traumatism or nervous debility.

SYMPTOMS.—Circular areas of baldness appear on the scalp, sometimes coming on with considerable rapidity. At first the skin seems unchanged, but later becomes smooth and white and apparently somewhat atrophied, doubtless from the loss of the hair roots. Scattered here and there over the bald area, but more abundant at its periphery, will be found a number of short hairs of the characteristic "exclamation point" appearance, the free end being of normal size and dark, the neck atrophied and contracted, the bulb of the inner end making the "point" when extracted. These areas of baldness may rapidly increase in size and coalesce until a large portion of the scalp is affected.

DIAGNOSIS.—Alopecia areata is in some respects closely allied

to ringworm and may be confused with it. The microscope shows the characteristic spores of the parasite in tricophytosis, and close examination with the lens will show that the follicles are not completely emptied. In ringworm the hairs are crushed by the forceps, while they do not yield in alopecia areata.

In lupus erythematosus the area affected is irregular in shape, hyperemic and develops more slowly.

In syphilitic alopecia there are usually other evidences of the disease, and the hair becomes thin in irregular patches, but does not entirely fall out, as in alopecia areata.

FIG. 2 ALOPECIA AREATA.

In ordinary idiopathic baldness the affection is symmetrical, commencing at the vertex or in the temporo-frontal region, and is usually associated with seborrhea.

PROGNOSIS.—The disease is generally curable. After forty years of age it is less tractable. In all cases persistence in treatment is necessary.

TREATMENT.—It is well to keep in mind the possibility of a nervous cause and give general treatment which will restore nervous tone. Rest, outdoor air and careful exercise are of value.

Iron, arsenic, strychnia, cod-liver oil, malt preparations and the hypophosphites may be given to meet indications.

The local treatment is the most valuable and should be stimulating. Sulphur ointment (10-15 per cent) is satisfactory in many cases. It should be thoroughly rubbed in twice a day. Stelwagon recommends the following:

Tinct. capsicum .....dr. 2½
Tinct. cantharides .....dr. 2½
Oil turpentine .....dr. 2½

Chrysarobin has been found efficacious. It may be used in a 5 to 20 per cent ointment, dissolved in chloroform, or in the following stick:

Chrysarobin .....dr. 3
Wax .....dr. 2
Lanolin .....dr. 5

Melt and shape into a rod. Rub vigorously into affected part.

Jamieson recommends the following:

Stronger ammonia water.....oz. ½
Chloroform .....oz. ½
Oil sesame .....oz. ½
Oil lemon .....dr. ½
Sp. rosemary, enough to make.....oz. 4

To be used cautiously, until tolerance is acquired.

In obstinate cases occasional blistering with cantharides or painting with pure carbolic acid may be necessary. This should not be resorted to in children.

AMENORRHEA; SUPPRESSION OF THE MENSES.

DEFINITION.—Absence or suppression of menstruation between puberty and the menopause, except during pregnancy and lactation.

ETIOLOGY.—Among the causes may be mentioned defective development of the pelvic organs; atresia in any part of the genital canal; secondary atrophy. It often occurs during typhoid and the eruptive fevers and in the course of other acute diseases; also as a result of debilitating conditions, such as phthisis, malaria, anemia and chlorosis. Other causes are travel, sea-voyages and change of scene or climate; overwork or overstudy, especially in young girls; insufficient food and poor hygienic surroundings; an excessive accumulation of fat and lesions of

the genital apparatus, as endometritis, metritis, parametritis and the various uterine displacements and adhesions following inflammatory affections. Suppression may follow emotional disturbances as anger, fear, anxiety or grief, or may occur during the menstrual period as the result of exposure to cold.

SYMPTOMS.—These are dependent upon the disease which causes it. In many cases there are none aside from the absence of the menstrual discharge. Usually there is quite an array of nervous symptoms, as headache, neuralgic pains, flashes of heat and cold, cardiac palpitation, nausea, constipation, a sense of weight in the abdomen and general "nervousness." Hysterical symptoms may supervene. Acute suppression from "cold" causes local pain, a sense of weight and bearing down, soreness, slight fever, headache and general malaise.

TREATMENT.—This is dependent upon the cause, therefore every effort should be made to determine this and restore the general health to a proper standard, by change of habits, proper mental and physical relaxation, correction of digestive disturbances, the relief of constipation, outdoor life and suitable exercise, baths, massage and the Swedish movement.

If due to faulty development and there recur periodical local or general disturbances indicative of attempted menstruation, benefit may result from dilatation of the cervix and stimulation with the faradic current. Regular and systematic pelvic massage may also aid in initiating the flow.

In general debility tonic treatment is indicated. This is especally the case in anemia and chlorosis. Strychnin, arsenic and iron are the most useful remedies. Blaud's pill and the hypophosphites are often extremely useful.

In chlorosis arsenic should be given in preference to all other drugs. Lutaud recommends the following when there is anemia and debility:

Mercuric chlorid	gr. 1
Sodium arsenate	gr. 1
Strychnin sulphate	gr. 1
Potassium carbonate	gr. 30
Iron sulphate	gr. 30

Make 60 pills. One after each meal.

The following by Fothergill is good in anemia combined with amenorrhea:

Arsenous acid .....gr. 1
Iron sulphate, dried .....dr. ½
Powd. black pepper .....dr. 1
Pill aloes and myrrh.....dr. 1

Make 40 pills. One twice a day after meals.

If preferred, one of the organic preparations of iron may be used—

Ferratin .....dr. 3
Ext. aloes .....gr. 14
Comp. ext. rhubarb .....gr. 9

Make 30 tablets. One or two twice daily.—Williams.

Obesity, if present, should be relieved by regulated diet and prescribed exercise. The daily use of salines is useful in this condition. Kissingen and Vichy waters or the effervescent salts may be taken on alternate days with good effect.

The treatment of suppression due to exposure to cold consists of rest in bed, hot foot baths, the sitz bath, hot fomentations to the lower abdomen, saline laxatives and sinapisms to the calves and thighs. Manganese binoxid or potassium permanganate given in 1 or 2 gain doses in pills or tablets three or four times daily is frequently successful. Dewees recommends the following treatment, which is valuable in many cases of amenorrhea:

Sol. iron and quinin citrate.....oz. 1
Fowler's solution .....dr. 3
Strychnin .....gr. ½
Atropin .....gr. ½
Elix. orange peel, enough to make.....oz. 8

Teaspoonful in water three times a day before meals.

When the premenstrual symptoms appear this is discontinued and the manganese binoxid or potassium permanganate are given as already directed for suppression. The manganese preparations are the most generally useful drugs we have for this condition. When they fail, santonin in 10 grain doses at bedtime is valuable. In stout patients 1 to 2 drams of senecio vulgaris three times a day may be tried with some hope of benefit.

Faradism, galvanism and static electricity are extremely valuable adjuncts to other treatment. Intra-uterine electrization with the negative pole, using a current of 5 to 25 milliamperes, is often very efficacious in properly selected cases, when the

amenorrhea is due to local causes. Ovarian extract has been used in amenorrhea with some success.

ANEMIA.

DEFINITION.—A condition of the blood in which there is a deficiency in its quantity or quality; in most cases the number of red blood corpuscles is diminished.

VARIETIES.—There are two general varieties, (1) primary, including chlorosis and pernicious anemia, in which the cause is found in the blood itself; (2) secondary, in which the condition is dependent upon loss of blood, poisons, or exhausting general or local diseases, as malaria, tuberculosis and cancer.

SYMPTOMS.—The principal symptom common to all forms of anemia is the unnatural pallor of the skin and mucous membrane. This is associated with more or less loss of strength, lassitude, nervousness, cardiac palpitation, shortness of breath and headache. The extremities are usually cold. Women suffer from menstrual disorders and there is likely to be constipation. Systolic murmurs are frequently heard over the aorta and the pulmonary and carotid arteries.

CHLOROSIS; GREEN SICKNESS.

ETIOLOGY.—This is a form of anemia that occurs most frequently at about the time of puberty. Among the causes to which it is ascribed are tuberculosis and other infectious diseases, overwork, unhygienic surroundings, improper food, constipation and the absorption of ptomains from the bowel.

SYMPTOMS.—The symptoms are those of anemia of an exaggerated type. There is often perversion of the gastric functions, sometimes anorexia, sometimes greatly increased appetite; coating of the tongue, foul breath and constipation. There is usually no loss of flesh. Hysterical manifestations are common. The skin takes on a peculiar yellowish-green pallor, which is characteristic of the disease.

The blood shows a great reduction in the quantity of hemoglobin and only a slight decrease in the number of red cells. The quantity of white blood corpuscles is about normal and the number of blood plates is increased.

PROGNOSIS.—These cases usually recover under appropriate treatment.

TREATMENT.—In severe cases, complete rest in bed should be required. Special attention should be given to the correction of digestive disorders and the relief of the co-existing constipation. This is a matter of great importance since autointoxication has been shown to be one of the chief elements in its causation. The diet should therefore be carefully chosen and consist of simple, nutritious food. An abundance of milk and eggs makes the most satisfactory dietary. Raw meat is recommended.

The bitter tonics are often useful in these cases, as condurango, gentian, cinchona and nux vomica. These may be combined with suitable laxatives, as cascara or rhubarb, or an occasional saline should be given.

The most valuable drug in the treatment of chlorosis is iron; it is of specific value and may be depended upon to cure the great majority of cases. Probably the most effective form for its administration is Blaud's pill. Osler recommends Niemeyer's method of preparation:

Powd. iron sulphate.....oz. ½
Potassium carbonate .....oz. ½
Tragacanth, a sufficient quantity.

Make 96 pills. Take at first 1 pill 3 times a day and increase until 3 pills are taken 3 times a day.

Arsenic may be given with decided benefit in many cases, alone or in combination with iron, as—

Arsenous acid .....gr. 1
Ext. nux vomica .....gr. 5
Blaud's pill .....dr. 1

Make 20 pills. One after meals.

The following should prove a useful formula:

Iron and ammonium citrate.....dr. 1
Potassium citrate .....dr. 2
Fowler's solution .....dr. 1
Tinct. nux vomica .....dr. 2
Comp. tinct. cinchona, enough to make.....oz. 4

A teaspoonful in water after meals.

On account of the frequently co-existing digestive trouble intestinal antiseptics are often indicated, as the sulphocarbolates, salol, benzo- or betanaphthol. An excellent combination is the last named drug with Blaud's pill, e. g.:

Beta-naphthol .....gr. 5
Blaud's pill .....gr. 2

PERNICIOUS ANEMIA.

ETIOLOGY.—This form of anemia occurs more frequently in males and during the middle period of life—from thirty to forty. Its cause is still obscure. Hunter believes it due to the absorption of ptomains from the intestinal tract, which cause rapid destruction of the red blood cells, especially in the portal system. A profound anemia, similar in character, is caused by intestinal parasites (anchylostoma and bothriocephali), follows parturition, or is associated with chronic gastritis or carcinoma.

SYMPTOMS.—The characteristic symptoms of anemia (pallor, weakness, palpitation and dyspnea on exertion) come on gradually without apparent cause. Later the skin takes on a characteristic lemon-yellowish tint. The digestion is disturbed, the appetite generally poor and nausea and vomiting frequent. Constipation or diarrhea may be present. The patient seldom emaciates. There is usually more or less irregular fever during the course of the disease. A great variety of nervous symptoms may manifest themselves, including neuralgic and other pains and various disturbances of sensation, but headache is the most common. Finally the ankles become edematous and hemorrhages occur from the mucous surfaces, as the nose, gums and retina. The debility in the end becomes extreme and the patient passes into a half torpid condition from which he never revives.

The blood is pale and the serum may make up 90 per cent of its entire volume. The red corpuscles are chiefly affected and are greatly reduced in number, varying from 500,000 to 1,000,000 to the cubic millimeter. Quincke reported a case in which only 143,000 were found to the cubic millimeter. The hemoglobin is usually somewhat reduced in quantity, but in rare cases is actually increased, as in a case reported by Osler. The red corpuscles are irregular in size and shape, showing microphytes, macrocytes and poikilocytes and many nucleated red cells, especially macroblasts, are present. This condition is characteristic of pernicious anemia. The number of leukocytes is about normal or slightly decreased.

PROGNOSIS.—The hope for cure is entirely dependent upon the discovery of a cause. It is, however, slight. Recovery is rare and a fatal termination usually results within one or two years.

TREATMENT.—The hygienic and dietetic treatment is extremely important. Rest in bed, massage and careful dieting should be considered essential when the symptoms are pressing. The possibility of an intestinal toxemia should be kept in mind. Hunter prescribes only farinaceous foods, since he considers them less prone to putrefactive changes. Constipation should be corrected and intestinal antiseptics prescribed as indicated in the article on Chlorosis.

Iron is of little value in pernicious anemia. The most valuable drug is arsenic, and this is sometimes actually curative. It must be given in large doses, commencing with 3 minims of Fowler's solution three times a day and increasing until 20 to 30 minims are taken at a dose, unless the stomach is intolerant. When toxic symptoms appear discontinue treatment for a week, then commence again at the maximum dose and continue as before. Occasionally arsenous acid will agree with the patient better.

The glycerin extract of bone marrow has been used with some success in this disease. One or two teaspoonfuls may be given thrice daily.

SECONDARY OR SYMPTOMATIC ANEMIA.

ETIOLOGY.—A direct cause of anemia is extensive hemorrhage. The term secondary anemia is however more properly applied to those forms of the disease which occur in the course of general diseases like malaria, septicemia, nephritis, syphilis, tuberculosis, chronic dyspepsia and cancer. Poisoning by lead, arsenic, mercury and phosphorus may also cause it.

SYMPTOMS.—The general symptoms of anemia are practically identical with those met in other forms of the disease. They are usually associated with those peculiar to the causative condition.

There is a decrease both in the number of red corpuscles and in the quantity of hemoglobin. In severe cases the cells show variation as to size and shape, and nucleated cells may be present. The number of polynuclear leukocytes is often increased.

PROGNOSIS.—The prognosis is dependent upon the cause.

TREATMENT.—In anemia following hemorrhage, injection of warm normal salt solution (.6 per cent) should be used. The needle should be inserted in the loose muscles of the nates or

chest and one or two pints allowed to run in slowly from a fountain syringe. Rectal injections of this solution may be used in emergency. The following is a good substitute:

Sodium chlorid	Gm.	5
Sodium hydroxid	Gm.	1
Sodium sulphate	Gm.	25
Distilled water	Gm.	1000

A liberal diet and the administration of iron completes the treatment.

In anemia secondary to poisoning or disease, treatment, in order to be effective, must be addressed to the removal of the cause, but for the depraved condition of the blood iron and arsenic are the most valuable remedies. The first may be given in the form of the carbonate as Blaud's pill, one to three being given three times a day. Reduced iron in doses of 1 to 5 grains, the sulphate in the same dose or the tincture of the chlorid (5 to 15 minims) are all useful preparations. Children and patients with sensitive stomachs find the solution of the peptonate of iron and manganese a palatable and efficacious remedy. Arsenic is usually given in the form of Fowler's solution, commencing with 3 to 5 drops and increasing to the point of tolerance. The following are suggestive formulæ:

Mass iron carbonate	dr.	1
Arsenous acid	gr.	1
Quinin sulphate	gr.	40

Make 40 pills. One or two thrice daily.—Potter.

Tinct. iron chlorid	dr.	4
Dil. phosphoric acid	dr.	6
Spts. lemon	dr.	2
Syrup, enough to make	oz.	6

A dessertspoonful in water after meals.—Goodell.

Fowler's solution	m.	16
Bitter wine of iron	oz.	2

A teaspoonful in water three times a day for a child 2 years old.—Powell.

Various organic iron preparations are now in use and give good results. Ferratin in daily doses of 15 to 25 grains, hemoglobin (75 to 150 grains daily), hemogallol (45 to 90 grains daily) and ferro-somatose (75 to 150 grains daily) are useful remedies.

ANEURISM.

DEFINITION.—Enlargement of an artery or vein, due to dilatation of the vascular walls.

VARIETIES.—The arterial varieties are of greatest medical interest. An aneurism is tubular or fusiform, if it presents a uniform circular enlargement; sacculated, if it projects from one side to form a sac; dissecting, if the blood has dissected a path between its external and internal coats.

ETIOLOGY.—Aneurisms usually occur during middle life and are due to arterial degeneration from atheroma or fatty changes. Syphilis is a common factor. Sudden or severe exertion or traumatisms are exciting causes.

SYMPTOMS.—The symptoms are dependent upon the size and location of the affected artery. Usually a tumor may be detected. This is expansile synchronously with the beat of the heart; auscultation reveals a blowing or rasping sound over the sac and along the course of the artery and the pulse of the affected side at the distal side of the aneurism is unnaturally weak. In aortic aneurism there is dulness on percussion over the tumor. An interesting symptom of aortic aneurism is Oliver's sign. This is an up and down motion of the trachea produced by the pulsation of the aneurismal sac. It can be detected by grasping the cricoid cartilage between thumb and finger and drawing the trachea upward with the neck relaxed. Cough is usually present in thoracic aneurism and is due to pressure and attendant bronchitis. Pressure on the recurrent laryngeal nerve causes dyspnea and frequently hoarseness and loss of voice from the resulting paralysis of the vocal cords. Difficulty may be experienced in swallowing.

PROGNOSIS.—Death usually occurs within one or two years. This may be caused by rupture of the aneurismal sac, exhaustion or heart failure.

TREATMENT.—The most satisfactory medicament is iodid of potassium, given in 10 to 20 grain doses, three times a day. This amount is increased to 80 or 90 grains daily. Whatever the explanation of the rationale of this treatment it often gives very satisfactory results—either by modifying the arterial changes or depressing the action of the heart. Tufnell's method of treatment consists of rest in bed for two or three months and a very

restricted diet. He prescribes for breakfast, 60 grams of bread and butter and 60 grams of milk; for dinner, 90 grams of meat, 90 grams of bread and potatoes and 120 grams of water and claret; for supper, 60 grams of bread and butter and 60 grams of tea. Douglas Powell allows during the twenty-four hours 300 grams of solids and 240 grams of liquids and administers laxatives.

Calcium chlorid is recommended on account of its power of increasing the coagulability of the blood. It should be used in large doses (40-60 grains daily, or a 2-per-cent solution injected). It is of doubtful efficiency. Recently French surgeons have reported cures by the use of subcutaneous injections of gelatin. Lancereaux recommends a solution of 2 Gm. of the white gelatin in 100 Gm. of normal salt solution, of which 250 Cc. should be injected into the buttock, at intervals of 10 or 15 days. Ten to twenty injections are sufficient.

Among other methods of treatment in use are compression, acupuncture, filling the sac with a foreign substance and galvanopuncture. The most brilliant results have been attained by D. D. Stewart, who passes into the sac a coil of gold or silver wire, from 3 to 10 feet in length, according to the size of the aneurism, and electrolyzes the tumor. The anode is connected with the wire and a large, clay, Massey rheophore is connected with the negative pole. A strong galvanic current of 50 to 80 milliamperes should be employed for one-half hour to an hour, according to the tolerance of the patient. In some cases the resultant clot is so firm that a radical cure is probably produced.

ANGINA PECTORIS.

Definition.—Sudden and agonizing pain in the region of the heart, usually due to cardiac disease.

Etiology.—It usually occurs after middle life and is much more common in men than in women. The predisposing causes are alcoholism, gout, rheumatism, syphilis, Bright's disease and diabetes,—conditions that favor arteriosclerosis.

Pathology.—Angina pectoris is associated with many of the forms of organic heart disease. The most common pathological findings are, however, sclerosis and obstruction of the coronary

arteries, degeneration of the heart muscle, cardiac hypertrophy, aortic regurgitation and atheroma of the aorta. There is a nervous element, due probably to irritation of the sympathetic ganglia, causing the paroxysm of heart pain; by reflex irritation of the motor nerves this causes spasm of the cardiac muscle, and very likely arterial spasm as well.

SYMPTOMS.—An attack generally comes on suddenly after exertion, excitement or a hearty meal, with agonizing, tearing, stabbing pain in the heart or beneath the sternum, radiating toward the shoulder and down the left arm. Sometimes it is felt in the head and neck, the opposite arm or more remote portions of the body; in rare cases the seat of the pain is not referred to the cardiac region at all. With it, there is a sense of constriction as if the heart were being crushed in a vise. The face becomes very pale and anxious in expression. The patient finds it impossible to breathe or move without increasing his distress, and there is an overcoming sense of impending death. The pulse is variable, but is usually full and strong, occasionally accelerated, but sometimes retarded. The attack generally lasts a few seconds or minutes, and is very prone to recur at increasingly shorter intervals.

DIAGNOSIS.—The diagnosis is not difficult, and there are few conditions with which it is likely to be confused. Intercostal neuralgia follows the course of an intercostal nerve, and there are tender points near the vertebræ and sternum and in the axillæ.

In gastralgia the pain usually occurs when the stomach is empty, and is not radiated to the shoulder and arm. There is no fixation of the body. It is more likely to occur in anemic young women, and there is no evidence of organic heart disease.

Hysterical angina occurs in neurotic females, is not associated with heart disease, usually comes on at night, does not induce fixation and is associated with nervous excitement.

In cardiac asthma pain is not a prominent symptom and there are the usual evidences of compensatory failure.

PROGNOSIS.—Very grave, though with care life may be preserved for years. The first attack may prove fatal.

TREATMENT.—Inhalation of nitrite of amyl gives the quickest relief. A "pearl" may be crushed or a few drops sprinkled in a

handkerchief. Nitroglycerin ($^1/_{100}$-$^1/_{50}$ grain) hypodermically or in a tablet by the mouth acts almost as quickly. If these fail to give relief morphin (¼ gr.) and atropin ($^1/_{150}$ gr.) should be used subcutaneously. If the heart's action is weak reinforce it with strychnin ($^1/_{30}$-$^1/_{20}$ grain), digitalis and camphorated oil hypodermically, and apply stimulating applications over the precordium and heat to the extremities.

During the interval the patient should be given appropriate treatment for the exciting malady. Complete relaxation from business cares is imperative. To lower arterial tension nitroglycerin or nitrite of sodium (2-5 grains) should be taken three or four times a day. Bradbury recommends erythrol tetranitrate (1 gr. four times a day).

Potassium iodid in 10 to 15 grain doses three times a day is regarded as very effective. This dilates the arterioles, lowers tension and has an absorptive effect upon the hardened connective tissue. It may be alternated with the nitroglycerin. General tonics as strychnin, arsenic and iron are often indicated. Schott uses saline baths which contain 1 to 3 per cent of salt and ¼ to 1 per cent of calcium chlorid, and systematic exercise and movements for improving the nutrition of the heart muscle.

APHASIA.

DEFINITION.—A disease of the memory in which the power of comprehending, speaking or writing words or syllables is lost.

VARIETIES.—Motor and sensory. Motor aphasia comprises (1) aphemia, inability to speak words; (2) agraphia, inability to write words; (3) amimia, inability to express thoughts by signs.

Sensory aphasia comprises (1) auditory aphasia, word-deafness; (2) alexia, word-blindness; (3) apraxia, inability to interpret ideas conveyed by sight or any one of the other senses.

ETIOLOGY.—Aphasia is caused by cerebral lesions; by softening, tumors, syphilitic disease, cerebral hemorrhage, congestion of the brain and traumatisms. It may occur in the course of the infectious fevers, or follow epileptic and other convulsions.

PATHOLOGY.—The nature of the defect depends upon the portion of the brain affected. The speech centers being found upon the left side, this is usually the location of the diseased part (in the left-handed it may occur upon the right side). The

lesion in aphemia is in the third left frontal convolution; in agraphia, in the second frontal convolution; in amimia, frequently in the third frontal. In auditory aphasia the first and second temporal convolutions are affected; in alexia, the angular and inferior parietal gyri; in apraxia, the supramarginal and angular gyri.

SYMPTOMS.—In motor aphasia the patient comprehends perfectly what is said to him, but is unable to express himself in words. Speech is not usually entirely lost, for he retains certain letters, words or group of words. He can write; often he can sing. It may be that only a few words from his vocabulary are lost, or that he misuses or misplaces certain words or syllables (paraphasia). Agraphia consists of inability to write, because of loss of memory of the necessary movements. The patient can usually copy letters and designs, but the ideation necessary for the formation of words is lost. Agraphia is generally complicated with aphemia. Sign languages as practiced by deaf mutes (amimia) may also be affected by a lesion of the brain.

In auditory aphasia (word-deafness) the patient hears sounds, but attaches no meaning to spoken words. Some can repeat words, but do not understand what they themselves say, since articulate speech gives expression to no idea. In word blindness (alexia) written or printed words are seen and distinguished, but have no meaning. This is rarely complete. There is usually more or less complication with word deafness or motor aphasia. In subcortical alexia the patient can read, but does not understand what he is doing. In apraxia, objects which are seen, no longer have any meaning or use to the patient; information of things coming to him through the other senses is likewise negative.

PROGNOSIS.—Dependent upon the cause. When it occurs in cerebral softening there is no hope of recovery.

TREATMENT.—Give the causative disorder appropriate treatment. In mild cases, due to mental strain or excitement, rest alone will produce a cure. Careful individual instruction will aid in overcoming the symptoms and restoring the word memory. If there is a suspicion of a syphilitic element the patient should be put upon mercury or potassium iodid in full doses.

APOPLEXY; CEREBRAL HEMORRHAGE.

DEFINITION.—Hemorrhage into the substance of the brain or the pia mater due to the rupture of a blood vessel.

ETIOLOGY.—Apoplexy usually occurs after middle life; it is rare before forty. The predisposing cause is some degenerative change in the arterial walls that causes a loss of elasticity. This may be due to atheroma, fatty degeneration, syphilis or the formation of miliary aneurisms. Nephritis, gout, rheumatism, alcoholism, heart disease, senility, and anemia and other depraved conditions of the blood are prominent factors. The provoking cause is usually sudden or severe exertion, emotion or excitement, which temporarily raises the blood pressure.

PATHOLOGY.—We invariably find some change in the vessel wall that weakens its resistance. The nature of this is indicated by the etiology. The amount of extravasated blood varies greatly in quantity and is dependent upon the size of the ruptured artery and the character of the tissue surrounding it; in white matter there is more resistance to the outflow than in gray. Very often the blood finds its way into the cavities of the brain or the meninges, insinuating itself into all accessible places and sometimes breaking a way through the cerebral cortex. It coagulates rapidly and soon forms an irregularly shaped clot, surrounded by an edematous zone of compressed brain substance, studded with minute points of capillary hemorrhage. The symptoms produced are dependent upon the locality and size of this clot.

SYMPTOMS.—Premonitory symptoms which point to an impending attack are headache, dizziness, disturbances of vision, ringing in the ears, insomnia, tremor, nosebleed, thickness of speech, loss of memory, and a sense of tingling or numbness in the side which is to be affected. These are not invariably present.

The attack usually comes on suddenly, though in mild cases the symptoms may appear gradually. These are severe localized headache, vomiting, yawning and sighing, and an increasing condition of mental stupor which usually merges into complete coma. In severe cases the patient becomes almost immediately unconscious. During this period the breathing is slow, deep, loud and stertorous. The pulse at the outset is full and slow,

often irregular; later it may become more frequent. The face is usually flushed and swollen, the lips puffed out and blue; but sometimes the face is pale. The temperature is at first subnormal and higher on the paralyzed side.

If the coma continues, slight, irritative fever may follow in two or three days. The eyes are injected; the pupils sometimes dilated, sometimes contracted. Pupillary inequality is a serious symptom and significant of a large effusion. Paralysis occurs upon the side of the body opposite the cerebral lesion. Sensation is usually present.

In many cases the head and eyes are turned toward the unaffected half of the body, while the tongue, if protruded, deviates toward the paralyzed side. Motion is limited to one lateral half of the body; the affected limbs are completely powerless. The feces and urine may be discharged involuntarily. Convulsions are rare, being more common when there are large hemorrhages into the meninges. If the hemorrhage continues the coma becomes more deep, the pulse grows feeble, the respiration assumes the Cheyne-Stokes type, and death finally follows.

In favorable cases consciousness gradually returns; the paralyzed muscles become at first slightly rigid; this passes away in a few days or weeks and muscular power gradually returns in at least a portion of the body, the presence or extent of permanent paralysis depending upon the size of the clot. As a rule, recovery is only partial, motion of the leg being more or less wanting, and the arm entirely useless. The use of the muscles of the face is generally entirely restored. Troublesome bed sores may complicate convalescence. Usually the mental powers are unimpaired, but sometimes symptoms of cerebral softening supervene.

Diagnosis.—In uremia there is a history of kidney disease, albuminous urine and more or less edema. Unconsciousness comes on gradually and is preceded by convulsions.

In alcoholic intoxication there is the smell of liquor; the patient can be roused; there is no stertorous breathing, no paralysis, and a feeble pulse.

In opium poisoning there are pin-head pupils, while in apoplexy they are usually dilated or irregular. The coma comes

on slowly; there is no stertor or hemiplegia, and both pulse and respiration are exceedingly slow.

Embolism usually occurs early in life and is generally associated with valvular heart disease. The pulse is more likely to be weak and rapid, and the face pallid. The pupils are unchanged, and unconsciousness rarely complete or of long duration. Hemiplegia is present in embolism, but is usually right-sided. Recovery is rapid and complete. The symptoms are closely allied and the diseases often difficult to differentiate.

Thrombosis is more common in old age, but may occur in young adults. It also produces hemiplegia, and this is more commonly preceded by prodromata than apoplexy. Its development is gradual and coma is slight or wanting. The pulse is weak and the development of an attack is *favored by low arterial tension*. It often appears during sleep. The temperature is usually unchanged, the face pale, and there is no difficulty of breathing. Slight convulsions are common. Motor recovery is slow, aphasia persistent, and there is a special tendency to cerebral softening. The differential diagnosis is difficult, but important, since treatment is essentially different.

Hysteria presents only superficial coma; the patient can be aroused by cold; no stertor. Anesthesia of the affected side is present. There is usually a history of neurotic seizures. In post-hysterical conditions the affected limb is dragged or pushed instead of swinging.

PROGNOSIS.—Extremely grave. Deep or prolonged unconsciousness, extensive paralysis, embarrassed respiration, loss of reflexes, high temperature and convulsions are unfavorable signs. In old age the danger is much greater. Recovery is likely to be incomplete, with more or less motor paralysis, and often mental weakness. The tendency to a recurrence of these attacks makes the outlook gloomy, except in the rare cases that occur in childhood.

TREATMENT.—*Prophylaxis.*—Patients who have inelastic or degenerative arteries or have had prodomata suggestive of apoplexy, should be directed to avoid excessive exertion or mental excitement. In diet they should be simple and abstemious, depending largely upon farinaceous food and using sparingly or avoiding entirely stimulants and articles rich in uric acid and

the extractives, which, according to Haig, produce capillary contraction and high arterial tension. Constipation should be corrected by suitable cathartics, and the digestion kept in good order. Avoid extremes of heat and cold and equalize the circulation as far as possible by loose, warm clothing, preferably flannel. If the arterial tension is high, sedatives may be prescribed, such as aconite, nitroglycerin, and the iodids and bromids of potassium.

Treatment of the Attack.—The main object of treatment is to check further hemorrhage. In order to do this we desire to reduce the blood pressure in the brain, which can be done by relieving the general arterial tension and by drawing the blood to other portions of the body. The patient should be placed in a relaxed, semi-reclining position, with head and shoulders raised. This may often be varied to good advantage by turning him upon one side. This will sometimes greatly relieve the distressing embarrassment of breathing. Bowles recommended that the patient should be turned upon the paralyzed side.

An ice-bag or cold compresses should be applied to the head and neck, and warm bottles, sinapisms or friction to the extremities. Binders tied loosely around the limbs, so as to check somewhat the return of venous blood, also aid in abstracting blood from the cerebral supply. If the patient is robust and well nourished, the pulse full and incompressible, and the face congested, bleeding is indicated. Leeches applied to the temples or neck are useful.

The most common method of depletion is by the use of an active cathartic. This withdraws the blood from the cranium and removes from the body a considerable quantity of fluid. One or two drops of croton oil in a little glycerin or olive oil should be placed on the back of the tongue. This causes profuse catharsis. In place of this elaterium ($\frac{1}{8}$ to $\frac{1}{4}$ grain) may be given by the mouth, or hypodermically in smaller doses.

The vaso-depressant drugs which should be valuable are aconite, veratrum and gelsemium. These should be given in full doses when the patient can swallow and pushed to their physiological effect until undoubted sedation of the pulse is recognized. To farther lower arterial tension Thompson rec-

ommends that nitroglycerin ($^1/_{50}$ gr.) be given hypodermically, repeated in two or three hours.

It is important to watch the bladder and empty it with the catheter if necessary. Bed sores should be prevented by frequent change of position, perfect cleanliness and astringent alcoholic lotions.

Subsequent Treatment.—During convalescence, to promote rapid absorption, potassium iodid should be given in 10-grain doses three times a day. The bowels should be kept open by the frequent administration of calomel in divided doses. After all active symptoms have subsided the paralyzed muscles should be stimulated by faradism and massage. Strychnin internally or hypodermically may aid in the recuperative process.

APPENDICITIS.

DEFINITION.—Inflammation of the appendix vermiformis.

VARIETIES.—Three varieties are described. (1) Catarrhal, simple inflammation of the lining mucous membrane. This is often recurrent. (2) Ulcerative, in which the wall of the appendix becomes ulcerated. This is frequently due to the presence of a foreign body. (3) Interstitial, in which the body of the appendix becomes intensely inflamed, necrosed and often gangrenous. It is due to microbic infection, and terminates in perforation.

ETIOLOGY.—Appendicitis may occur at any age, though it is most frequent in young adults. It was at one time thought that foreign bodies, such as seeds or hardened fecal secretions were the main exciting causes, but they are found in only a very small percentage of cases. Anything that undermines the resistance of the bowel or produces neighboring inflammation favors its production. Such conditions are errors of diet, constipation, exposure and local causes, as injuries, typhoid fever and tuberculosis. The exciting cause is microbic infection.

PATHOLOGY.—Appendicular inflammation is caused in most cases by infection with the bacillus coli communis. Other bacteria are found, including staphylococci and streptococci. The last named organism is concerned in the most intense infections.

In the catarrhal form the mucous membrane becomes in-

flamed, more or less stripped of epithelium, and the deeper coats of the appendix swollen and infiltrated with inflammatory products. This condition may gradually subside, or the septic process may become more intense and involve the surrounding peritoneum. In any case the resistance of the part is permanently weakened and there is great tendency to recurrence.

In the more severe forms the appendix is ulcerated or necrosed, finally perforates and its contents pass into the abdominal cavity, where an abscess is formed. This locality is normally surrounded by peritoneum, with which the abscess may be localized. In most cases adhesions have already united appendix and parietal peritoneum and an extra-peritoneal abscess is formed, which may open under the skin above Poupart's ligament or into the small intestine, cecum, vagina or rectum. In other and more severe cases the disease progresses with rapidity, and perforation occurs before adhesions have formed. Even then a plastic inflammation may bind together adjoining loops of small intestine, forming a wall to protect the general peritoneal cavity from infection. In case this does not occur, a diffuse septic peritonitis results from general infection.

SYMPTOMS.—An attack of appendicitis commences suddenly with intense pain, usually felt in the right iliac fossa, though often more general at first, and more intense at the umbilicus. The pain is colicky in character and may radiate toward the epigastrium, the groin and the testicles. Associated with it is tenderness in the same region, generally most marked over McBurney's point—midway between the right anterior superior spine of the ilium and the umbilicus. This is sometimes misleading, however, since the point of tenderness may be found at other places more or less remote, occasionally on the left side.

Rigidity of the abdominal muscles of the right iliac region is present in many cases. There is more or less fullness and often a well-defined tumor may be made out on the third or fourth day. Nausea and vomiting are present in most cases and there is generally constipation, though sometimes diarrhea, especially in children. The patient lies on the back and the right thigh is flexed on the abdomen. The pulse is usually rapid and the temperature slightly elevated.

PROGNOSIS.—Catarrhal cases usually recover, but there is always danger of recurrent attacks, which at any time may assume a malignant type. In the more severe types of the disease the danger is much greater. If the general peritoneal cavity is affected it is usually fatal. The average mortality of medically treated cases is about 14 per cent.

TREATMENT.—*Prophylaxis.*—A person who has had an attack of appendicitis should attend carefully to diet and habits, on account of the danger of recurrence. He should avoid articles of food that may lodge in the appendix, form into fecal concretions or act as local irritants. Such are seeds and skins of fruit, husks of the coarser grains, some of the coarser, more fibrous vegetables, and, according to Bruce, milk, which, if not properly digested, may reach the cecum as hard curds. The latter advice is hardly necessary. Food should be eaten slowly and thoroughly masticated. Constipation should not be permitted. Laxatives are indicated in this condition, and gentle aperients may be employed when necessary, or the bowels may be moved by enemata, with an occasional mercurial followed by a saline. The body and limbs should be kept warm, and a flannel binder may be worn around the abdomen.

Treatment of the Attack.—It is desirable to limit the spread of the inflammation and, if perforation and abscess occur, to localize the process and prevent its reaching the general peritoneum. Nature provides for this by causing plastic adhesions to form between the peritoneal surfaces, in order to block further progress. To aid this process the first essential is absolute rest in bed. Slight movement may cause the breaking down of adhesions, permitting an extension of the disease. For the same reason Ochsner gives no food by the mouth for the first four or five days during an attack of appendicitis, since the presence of even the most digestible liquid food excites peristalsis, which may defer plastic adhesions or break them down when already formed. Peptonized milk or prepared liquid foods are given by the rectum. Feeding, when commenced, should consist entirely of liquid food of the simplest, most digestible character.

When the patient is seen immediately after the beginning of an attack, a quickly acting saline cathartic should be admin-

istered. No other laxative should be given during the course of the disease, but emptying of the lower bowel may be accomplished by copious enemata of soap and water. This may take the place of the saline, if the case is not seen until the disease is established and there is evidence of fecal accumulation, otherwise it is best deferred for two or three days or until the severity of the symptoms is past.

Hot or cold applications may be applied to the ileocecal region, as preferred by patient. The ice-bag, hot boric acid fomentations or turpentine stupes assist in relieving the pain. Authorities are generally agreed that opium or morphin should not be administered unless absolutely necessary, since its use disguises the symptoms, which are our principal guide as to the character, severity and probable outcome of the disease, viz., pain, restlessness, collapse, vomiting and constipation. It should be remembered that the physical signs and temperature give no evidence during the early stages of the disease concerning its gravity. It is important therefore that the physician should not be put off his guard by the artificial calm produced by an opiate. When, however, the pain is very severe, it is often necessary to give some relief, and the hypodermic may then be permissible but for its immediate effect only.

If, in spite of treatment, the symptoms show no amelioration within forty-eight hours, or if they continue to grow more severe in a less time than that, no more temporizing is safe, and the case should at once be turned over to the surgeon for operation, since this gives the only reasonable promise of safety.

ASTHMA.

DEFINITION.—A disease characterized by paroxysmal attacks of difficult breathing, due to spasmodic closure of the bronchi.

ETIOLOGY.—Asthma is essentially a nervous disease in which there is an associated sensitiveness of the nasal and bronchial mucosa; disturbance of this causes reflex irritation and spasm of the unstriped muscles of the air passages. It is often hereditary, or other neuroses may be found in the family history.

Among the efficient causes may be mentioned pathological conditions of the air passages, as nasal spurs, polypi, adenoids, or a bronchial catarrh; genital irritation, as in phimosis; local irritants, as pollen of plants, dust, tobacco, peculiar odors or cer-

tain drugs; digestive disorders, and especially an overloaded stomach; certain meteorological or climatic conditions, whose influence we do not fully comprehend.

It is now recognized that one of the most powerful factors in its causation is a disturbance of metabolism, causing the presence in the blood of uric acid or substances of this class. They are probably eliminated in some degree by the mucous membrane of the respiratory tract, setting up in the process an irritation with consequent bronchial spasm. Other manifestations of this diathesis, which may occur in the same person at different periods or in other members of his family, are eczema, sick headache, insomnia, acid dyspepsia, calculi and rheumatic or gouty attacks.

Asthma is also symptomatic of other diseases, as affections of the heart, Bright's disease and hay fever (which see).

PATHOLOGY.—The only constant pathological changes found are those of the cause, as when there are lesions of the upper-air tract, or those which follow the disease, such as emphysema or cardiac complications. The disease is purely functional.

SYMPTOMS.—Attacks of asthma often appear suddenly, but may be preceded by premonitory symptoms, as a sense of constriction about the chest, chilliness, flatulence and repeated sneezing. The paroxysm usually comes on at night or in the early hours of the morning. The patient is seized with a sense of sudden oppression and great dyspnea. There is a most intense desire for air, and in the effort to obtain it he leans forward upon his arms and unconsciously brings into use every accessory muscle of respiration. The difficulty of breathing is in expiration, not in inspiration; the chest remaining expanded and the abdomen protruding, on account of the descent of the diaphragm. The respiration is not increased in rapidity.

During the attack the face becomes flushed and at times almost livid; the eyes prominent, the skin cold and bathed in perspiration. The anguish is almost insupportable before relief comes. These attacks last from half an hour to several hours and terminate with the expectoration of sticky, stringy mucus, which on close examination reveals little grayish balls, making, when unrolled, the so-called Curshmann's spirals. These may frequently be recognized by the naked eye. The pulse is usually

slow and weak. The temperature is normal in the majority of cases.

DIAGNOSIS.—Dyspnea is present in diseases of the heart and kidneys, but there are other symptoms, which are recognized by physical examination and urinary analysis. In heart disease, dyspnea is increased by exertion; in both the tendency is for it to become continuous.

In the dyspnea of the acute respiratory diseases (bronchitis and pneumonia) there is rapidity of pulse, elevation of temperature, and the dyspnea is inspiratory.

In croup and laryngeal obstructive diseases the difficulty of breathing is inspiratory, not expiratory.

PROGNOSIS.—Asthma is not in itself a fatal disease. Long continued and frequent attacks may finally cause emphysema. Weakening of the right heart, with final dilatation and edema, occasionally follow. The hope for permanent cure depends largely upon the recognition of a specific cause. If this can be found and corrected, the case may be considered a curable one.

TREATMENT.—*Paroxysm.*—In treating the attack due attention should be given to the cause, and care should be taken not to put the patient in possession of remedies which might engender an unfortunate drug habit.

Quick relief may be obtained by the hypodermic injection of morphin (¼ to ½ gr.), with atropin ($\frac{1}{100}$ gr.). This is made still more effective by the addition of nitroglycerin ($\frac{1}{100}$ gr.). This combination may now be secured in tablet form, convenient for rapid use. Vogel recommends the hypodermic use of atropin alone ($\frac{1}{50}$ to $\frac{1}{100}$ gr.).

Other remedies which may be inhaled and more convenient for the use of the patient are nitrite of amyl (the pearls crushed in a handkerchief), sniffs of ether or chloroform. Internally, ether in some form is useful, or sedatives, like belladonna, lobelia or the bromids may be given, alone or in combination. Pepper recommends the following:

Ammonium bromid	gr.	160.
Ammonium chlorid	dr.	1½
Tinct. lobelia	dr.	½
Hoffman's anodyne	oz.	1
Syrup senega	oz.	4

A dessertspoonful [illegible] every hour or two.

Stevens uses—

Tinct. belladonna .....dr. 2½
Tinct. lobelia .....dr. 2½
Hoffman's anodyne .....dr. 6
Paregoric .....dr. 6
Syrup wild cherry bark, enough to make...oz. 4

A dessertspoonful every three hours.

According to Bruce, the following is effective:

Spts. ether .....m. 30
Arom. spts. ammonia .....m. 30
Tinct. bitter orange peel.....m. 20
Camphor water .....dr. 2
Distilled water, enough to make.....oz. 1

This dose every one-half hour to one hour until relieved.

Other useful prescriptions are:

Tinct. lobelia .....dr. 1
Tinct. nitroglycerin (1%).....m. 16
Sodium bromid .....dr. 5
Wine ipecac .....dr. 5
Ext. hyoseyamus .....gr. 8
Simple elixir—enough to make.....oz. 4

A teaspoonful every one or two hours in water.—Anders.

Sodium iodid .....gr. 2
Potassium bromid .....gr. 2
Fl. ext. euphorbia pilul.....m. 3
Nitroglycerin .....gr. $^1/_{200}$
Tinct. lobelia .....m. 2

For one tablet or capsule. From 1 to 4 three times a day. —Hare.

A great number of other drugs have been recommended, among them arsenic, tartar emetic, the valerianates, dracontium, quebracho, grindelia and euphorbia pilulifera. Combinations of these drugs may be improvised to meet emergencies.

In cardiac asthma Jackson recommends—

Strychnin sulphate .....gr. 1
Morphin sulphate .....gr. 1
Tinct. digitalis .....dr. 4
Water, enough to make.....oz. 6

Take a teaspoonful every 2 to 4 hours, as long as needed, or until the heart acts regularly.

Certainly an effective means of administering antispasmodic drugs, and one that is popular with patients, is by burning them

and inhaling their smoke. Sometimes the powdered drugs are made into cigarettes. Popular remedies of this class are the following:

Potassium nitrate 3i
Anise seed 3i
Stramonium leaves 3i
Tobacco ..... gr. 3

The smoke to be inhaled.—Pivel.

℞—

Stramonium ..... m. 3
Cannabis indica ..... m. 1
Lobelia ..... m. 1
Eucalyptus ..... m. 1
Tea ..... m. 1
Anise seed ..... gr. 60
Potassium nitrate ..... m. 15

℞—

Stramonium leaves ..... m. 1
Belladonna leaves ..... m. 1
Potassium nitrate ..... gr. 75
Opium ..... gr. 30

To be burned and the vapors inhaled.

℞—

Cubeb ..... m. 30
Lobelia ..... m. 30
Jaborandi ..... m. 1
Stramonium ..... m. 2
Potassium nitrate ..... m. 15
Grindelia ..... m. 1
Eucalyptus ..... m. 30
Cascarin ..... gr. 4

Burn from 1 to 3 drams, inhaling the fumes.

Smoking of tobacco is often efficacious with those who are not accustomed to its use.

Interval.—The cases of asthma in which treatment promises the greatest likelihood of permanent relief are those in which a definite cause can be found. A thorough examination should be made of the nasal cavities, and pharynx, and nasal spurs, polypi or adenoids removed if present. In these cases attacks may sometimes be prevented by the application of a 2 per cent solution of cocain to the nasal cavities, just preceding the onset. In a child, with an adherent prepuce or clitoris, a cure is sometimes effected when this condition is corrected.

The digestive organs are especially to be watched and any derangement corrected by proper diet and digestive hygiene. The theory of Haig that asthma is often a manifestation of the "uric acid diathesis" or latent gout is meeting with quite general acceptance among physicians. When, therefore, there is any evidence of this condition, the patient should be put upon an appropriate dietetic regimen; indeed, this plan is well suited to most cases of asthma, whatever the theory as to its causation, since these patients do the best on an unstimulating diet. There is plenty of evidence to show that the absorption of the intestinal toxins produced by decomposing food at least excites the paroxysms. It should be aimed to withdraw from the dietary articles which produce uric acid, or contain substances of the xanthin class; also foods that are likely to undergo acid fermentation in the stomach and bowels. The red meats should not, therefore, be used, or at least reduced to the lowest quantity. Tea, coffee and alcoholic drinks (especially wines), made dishes, pastries, rich sauces and gravies, should be forbidden, or permitted only in the most limited quantity; the acid fruits or vegetables interdicted and a minimum of sweets and fats allowed. Encourage simplicity of diet, since much mixture of food is almost certain to result in fermentation. Milk is generally regarded as the ideal food, and a farinaceous food may be given with advantage, but it is not wise to restrict patients to too close a diet. It must be remembered that a certain amount of nitrogenous food is necessary. Therefore, white meats, fish, oysters, eggs and green vegetables are allowable. These patients should be encouraged to drink freely of water, and the alkaline waters of the Vichy class are especially suitable. They should be encouraged to take plenty of outdoor exercise.

Often a change of climate will result in relief, sometimes in permanent cure, so long as the patient remains in the locality suited to him. No rules can be laid down as to the selection of the location, though a high altitude and a dry climate is best suited to the majority.

The drugs of most value in the treatment of asthma are potassium iodid and arsenic. The former is useful in most cases, but especially so when there is bronchial catarrh. This is usually given three times a day, commencing with five grains and

increasing to thirty. The combination with alkaline diuretics should be valuable in gouty cases. Bruce recommends the following:

Potassium iodid	gr. 1—3
Potassium bicarbonate	gr. 15
Ammonium carbonate	gr. 4
Camphor water	dr. 2
Distilled water, enough to make	oz. 1

This dose to be taken three times a day, three hours after meals.

After the frequency and severity of the attacks have subsided he follows this with arsenic, as in the following:

Fowler's solution	m. 3—10
Comp. tinct. cardamom	dr. ½
Chloroform water	dr. 4
Dist. water, enough to make	oz. 1

This dose three times a day after meals.

Fowler's solution (liquor potassi arsenitis) is usually given alone, commencing with five drops and increasing to ten or more or until tolerance is reached. It may then be alternated with the iodid. When the nervous element is a feature, and especially in children and old emphysematous patients, Murray considers arsenic the most suitable drug. It is in these cases a good plan to administer strychnin also in full tonic doses ($^1/_{60}$ to $^1/_{20}$ grain). In many of these patients the stomach is in a wretched state, and treatment with the following occasionally yields the happiest results:

Tinct. stramonium	dr. 2
Ammonium carbonate	dr. 1
Sodium carbonate	dr. 3
Powdered rhubarb	gr. 20
Chloroform	m. 20
Peppermint water, enough to make	oz. 8

A tablespoonful three times a day in an ounce of water.

As soon as a lull is produced in the symptoms, the patient is put on the arsenic treatment, as already directed.

It must be kept in mind that treatment must be persisted in for months if permanent benefit is to be expected.

BACKACHE.

ETIOLOGY.—Backache is not a disease, but a symptom which occurs in many forms of disease, both acute and chronic. It is a prominent symptom in smallpox, dengue, malaria, influenza and often of infectious diseases where the characteristic inflammatory symptoms soon clear up the question of diagnosis. In some chronic diseases it is occasionally the first, often the most prominent, subjective symptom, and is, therefore, brought early to our attention with a plea for relief. Among these conditions are locomotor ataxia, with sharp and shooting pains, usually primarily affecting the limbs; aneurism of the aorta, where erosion of the vertebrae may cause dull, grinding pain in the back, with shooting pain in various more or less distant parts; ulcer of the stomach, associated with hematemesis, hyperacidity and vomiting; uterine disease, with its clinical picture; and the pains due to the various forms of renal disease—movable kidney, hydronephrosis, pyelitis, perinephritic abscess, tuberculosis and renal calculus. Last, but probably most common, are the pains due to myalgia, in its most acute form known as lumbago. Probably the largest proportion of patients who seek relief from backache have this condition, although it is popularly supposed that "the kidneys are out of order." Although physical examination and a careful examination of the urine should be made to determine any renal trouble, in most cases it is safe to reassure the patient on this point. Not infrequently, however, there is associated a scanty, high-colored urine, and there is other evidence of a certain degree of congestion of the kidney. Most of these backaches are undoubtedly myalgias of a mild type, sufficient to cause much discomfort, and undoubtedly due to lithemia.

TREATMENT.—The treatment, of course, should be addressed to the causative disease. In backaches of the myalgic type it is well to keep in mind the relation of uric acid to its causation and the suggestion of passive renal congestion. The bowels should be moved thoroughly with a saline aperient, such as Epsom or Rochelle salts or Hunyadi or Apenta water, preceded by a mercurial if there is constipation. The flow of urine should be stimulated by an alkaline diuretic, as citrate or acetate of potassium in 10 to 30-grain doses every three hours. Salol and

the salicylates are peculiarly effective and may be combined with tonic doses of quinin, as—

Caffein .....gr. 1
Salol .....gr. 3
Quinin sulphate .....gr. 1

One capsule every 3 hours.

As an analgesic phenacetin, acetanilid or antipyrin may be found useful, giving these in suitable doses alone or in combination with salol or a salicylate. The following formula is useful:

Phenacetin .....dr. 1
Salol .....dr. 1

Make 12 powders. One every 3 hours, for pain.

But the following is better if there is any suggestion of renal congestion, or if the urine is scanty and high-colored:

Sodium salicylate .....dr. 2-5
Potassium acetate .....dr. 5
Elixir buchu compound, enough to make oz. 8

Two teaspoonfuls every 3 or 4 hours.

This alone will usually relieve the pain. If this is severe, the following solution may be tried:

Antipyrin .....dr. 2
Sp. ammonia aromat. .....dr. 2
Potassium citrate .....oz. 4
Simple elixir, enough to make.....oz. 4

A dessertspoonful every 2 or 4 hours.

BASEDOW'S DISEASE—*See* Goiter, Exophthalmic.

BED SORES.

DEFINITION.—Local ulcers of the skin resulting from prolonged pressure on any part of the body where the circulation is weak. They occur in persons who are compelled by illness or injury to remain in one position in bed for a long time. They often appear during wasting diseases and on parts of the body in which the trophic nerve supply of the skin is defective, as in spinal disease. Infrequent bathing of parts moistened by perspiration, urine, feces or wound discharges, and unclean linen predispose to their appearance.

TREATMENT.—A good hair mattress, careful adjustment of pressure to all parts of the body, frequent change in position

and scrupulous cleanliness will usually prevent the formation of bedsores. When a suspicious redness or local congestion is discovered an effort should be made to protect the part from further pressure by using the water-bed, the inflatable air-cushion or by extemporizing some apparatus which will answer the same purpose. Care should be used to prevent heat and moisture affecting the part. The skin should be hardened by bathing with alcohol, alone or with a little alum, spirits of camphor or distilled extract of witch-hazel. Or the following will be found useful:

Alum	oz. ½
Sodium chlorid	oz. ½
Water	oz. 16
Alcohol	oz. 16

After bathing, the part should be carefully dried and dusted with a suitable antiseptic powder, as salicylated talcum, aristol, europhen,

Or—

Alum	dr. 1
Salicylic acid	gr. 20
Boric acid	oz. 1

A writer in the "Trained Nurse" recommends, in connection with the alcoholic rubbing, the use of an ointment which improves nutrition, makes the part supple and impervious to moisture. She recommends for this purpose Horner's ointment, which is made as follows:

Alcohol	oz. ½
Castor oil	oz. ½

Zinc ointment, enough to make a soft paste.

Smear over the parts and rub until the greasy feeling has disappeared. This should be done twice a day.

When the skin seems about to break, painting with a solution of nitrate of silver (5 to 20 grains to the ounce) is recommended. If a slough has actually formed it should be removed by the forceps or a charcoal poultice, and the ulcer treated on antiseptic principles by daily washing with an antiseptic solution, careful drying and the application of dusting powders retained by a loose porous dressing protected by pressure. Bovinine is at present a popular application to trophic sores; it seems to furnish nutrition and promote healing.

BELL'S PALSY—See Facial Paralysis.

BITES AND STINGS—See Stings and Bites.

BLEPHARITIS.

DEFINITION.—An inflammation of the margins of the eyelids.

ETIOLOGY.—Many, perhaps most, cases are due primarily to eye-strain or errors of refraction. The strumous diathesis seems to predispose to its occurrence. Infection with micro-organisms and extension of neighboring inflammation, as from conjunctivitis or keratitis, are prominent causes. Obstruction of the lachrymal apparatus is sometimes present. Occasionally lice attack the cilia.

SYMPTOMS.—Blepharitis commences as a slight redness and swelling of the margins of the lids. This is due to infection and inflammation of the Meibomian glands and subsequently of the hair follicles. A gummy secretion, often quite copious, forms on the lids and causes them to stick together when closed for some time; drying on it forms scabs and crusts, which, when removed, frequently bring away some of the cilia which have been loosened by the inflammation of the follicles. The disease is prone to become chronic and may assume an ulcerative type. If long continued and severe the lids may be completely denuded of cilia. Eversion of the lid may complicate this condition. Conjunctivitis is frequently and trachoma occasionally associated with blepharitis. The lids sometimes become eczematous.

TREATMENT.—First remove all crusts by washing the lids with a warm alkaline solution, as of bicarbonate of sodium or borax. This should be done night and morning, gently and persistently mopping the lid with a piece of absorbent cotton until all secretion is removed. Then dry it carefully and apply the yellow oxid of mercury in ointment, as in the following:

Petrolatum .....dr. 2
Yellow oxid of mercury.....gr. 1—2

Or—

Yellow oxid of mercury.....gr. 1
Lanolin .....dr. ½
Diachylon ointment (Hebra), enough to make.dr. 2

The use of either of these ointments at bedtime after cleansing, as already directed, will usually be found sufficient to effect a temporary cure. Casey Wood believes that a strength of 2 grains to the ounce is generally sufficient for this ointment. If the lids are ulcerated they should be brushed with a 2-per-cent solution of nitrate of silver.

To effect a permanent cure it is necessary to remove the cause. Properly fitting spectacles and rest to overworked eyes will usually have the desired effect.

BLOOD POISONING—See Septicemia.

BOILS; FURUNCLES.

DEFINITION.—A boil is an acute inflammation of the deeper layers of the skin and adjacent connective tissue, forming a red painful tumor, the center of which, or "core," suppurates and is extruded.

ETIOLOGY.—Furuncles are due to staphylococcus infection by way of the hair follicles. They usually attack those who are "run down"; diabetics are particularly subject to them, while they may also occur in the course of Bright's disease. Local irritation and lack of personal cleanliness often is responsible for a "crop of boils." The infective nature of the disease should not be forgotten.

PATHOLOGY.—The presence and multiplication of bacteria sets up an intense inflammation around a hair follicle through which the serum enters the deeper layers of the skin with consequent infiltration of numerous leucocytes, which cause occlusion of the capillaries, blood stasis and necrosis of the center of the inflamed area or "core."

SYMPTOMS.—The symptoms are well known, consisting of the appearance of a hard, red, intensely painful, subcutaneous tumor which finally ends in suppuration.

PROGNOSIS.—Good; there is practically no danger to life.

TREATMENT.—*Local Treatment.*—If seen early, an effort should be made to abort the boil. Many local applications have been suggested for this purpose. Among these are painting with several layers of tincture of iodin or collodion. Salicylic acid (1½ to 2 grains to the

dram of collodion), pure alcohol, alcohol containing 5 per cent of tincture of benzoin or 2 per cent of salicylic acid, or nitrate of silver solutions (20 grains to the ounce) are also recommended. Walker says that by the continuous use of Unna's mercury and carbolic plaster, boils which appear as if they would inevitably burst slowly disappear and the less advanced ones are rapidly absorbed. Dr. Bulkley is often able to abort furuncles by using the following:

Carbolic acid	gr. 5
Fluid extract ergot	dr. 1½
Powdered starch	dr. 2
Zinc oxid	dr. 2
Cold cream, enough to make	oz. 1

This is spread upon lint or absorbent cotton and a thick pad of it applied over the affected part. Another preparation of undoubted value is a 25 to 50-per-cent ointment of ichthyol combined with Hebra's diachylon ointment and applied in the same way as the above. Stelwagon uses:

Ichthyol	dr. 1
Lead plaster	dr. 2
Resin plaster	dr. 2

Any of these will often successfully put an end to an incipient boil.

The injection of carbolic acid into the center of a forming boil has been warmly advocated. It is best performed as described by a writer in the Peoria Medical Journal: "To render the procedure painless, a few drops of cocain are introduced into the tissue and cavity of the boil, using a very fine needle, which is at first allowed to rest with its point upon the inflamed surface with merely the weight of the syringe to gradually force it beneath the skin. If there is a drop of the cocain on the point of the needle it will soon prepare the way for the further and more forcible introduction without pain, and then the cavity is made the recipient of enough to completely anesthetize its surrounding tissue. When that is accomplished a little larger needle is readily introduced and several drops of 95-per-cent carbolic acid pressed tightly into the cavity. Absolute sterilization is invariably secured, and with absolutely no suffering to the patient whatever. A felon may be treated in the same way."

When suppuration has commenced, a small incision and the

application on a probe of pure carbolic acid to the sloughing center or careful cleansing with peroxid of hydrogen is undoubtedly efficacious. As soon as the boil has formed (and this process may be hastened, if it seems inevitable, by hot boric acid fomentations or the flaxseed poultice, to which a little laudanum or tincture of belladonna may be added for the relief of pain), it should be opened and its contents evacuated. The cavity thus made should be thoroughly cleansed and packed with antiseptic gauze.

To prevent infection of surrounding tissue, a daily warm bath and anointing the parts with a 5-per-cent carbolic ointment is advisable.

Internal treatment should be addressed mainly to building up the general health and should comprise nutritious food, the regulation of the bowels, suitable tonics and the correction, if possible, of any coexisting disease.

Various internal remedies have been recommended for the purpose of modifying the furuncular process. Of these probably the most popular is calcium sulphid, taken in doses of $^1/_6$ to $^1/_2$ a grain three or four times daily. W. F. Waugh uses it in larger doses; he insists that 1 grain doses should be given and at least seven times a day. There is a great difference of opinion as to the efficacy of this remedy, but it deserves trial. A morning draft of a tumblerful of fresh yeast has also been recommended. The eclectics put great faith in echinacea angustifolia in all septic conditions and the results claimed seem to justify this faith. The dose is 10 to 15 minims three times a day.

BRAIN, INFLAMMATION OF; ENCEPHALITIS; CEREBRITIS.

DEFINITION.—Strictly speaking, encephalitis is an inflammation of the brain substance, although the meninges are usually coexistently affected.

VARIETIES.—Various modes of classification have been adopted, but for practical purposes a division may be made, according to location, into (1) focal and (2) diffuse; or as to infection, into (1) non-suppurative and (2) suppurative encephalitis. A focal suppurative process causes an abscess.

Although the disease is commonly acute, it may terminate in cerebral changes of a chronic character.

FOCAL ENCEPHALITIS; ABSCESS OF THE BRAIN.

ETIOLOGY.—Abscess may be due to (1) traumatism, as a fracture, a blow, or even a scalp wound; (2) extension from an adjacent focus of inflammation, as the orbit, nose or ear (the last location is the most common source of brain infection); (3) pyemia, from a septic process going on elsewhere, as the lungs, liver or bones; (4) infectious fevers, including influenza and typhoid.

PATHOLOGY.—In rapidly fatal cases there is softening and disintegration of the brain substance without encapsulation. Usually, however, there is built up around the abscess cavity a fibrous wall which serves as a barrier to further extension of the inflammation. The abscess is usually single.

SYMPTOMS.—In acute cases, as in those due to severe injury, the disease goes through a rapid course and may terminate fatally within two or three days. More often the development is slow and the disease is protracted for weeks or even months. The symptoms are those of toxic absorption, cerebral irritation and pressure. They differ according to the location of the abscess. There is headache, usually very severe, vomiting not excited by food, and vertigo. There is usually a slight or moderate elevation of temperature, although it may be sub-normal. Occasional chills, sweating, exhaustion and leucocytosis are indicative of sepsis. The pulse is often slow (50 to 60) and often feeble. Epileptoid convulsions may be present. Other symptoms are mental dullness, followed by delirium, or coma. The pupils are irregular and optic neuritis is present. The pressure symptoms depend upon the location of the abscess. There may be motor paralysis or aphasia.

Non-suppurative attacks occur most commonly in children, but cases are reported in adults, especially alcoholics. They are caused by the toxemia of influenza, diphtheria, typhoid fever or by traumatism. The symptoms are practically the same as described—minus the septic symptoms.

PROGNOSIS.—Abscess of the brain is ultimately fatal unless the cavity can be reached by opening the skull. Non-suppura-

tive cases may recover, but usually leave some mental or physical defect.

DIAGNOSIS.—The differentiation from meningitis may be difficult, because the latter disease is often present as a complication. If the cause can be ascertained, as in trauma, middle-ear disease or gangrene of the lung, the case is simplified. In meningitis there is more affection of the cranial nerves and retraction of the head. In abscess the presence of pus is shown by leucocytosis. The temperature is more uniformly elevated in meningitis.

Brain tumors are seldom accompanied by fever and are much more chronic in their course; leucocytosis is absent.

TREATMENT.—The medical treatment of brain abscess is purely palliative. It includes careful asepsis of any external wound, the judicious use of laxatives, the ice-coil or the ice-bag to the head (which should be shaved), opium, the bromids and chloral to relieve pain and quiet excitement, and counter-irritation with fly-blisters to the head or occiput, leeches behind the ears or mustard to the back of the neck. But the essential treatment is surgical. An effort should be made to locate the abscess and drain it if accessible. Many of these cases might be prevented if care were given to the treatment of suppurating middle-ear disease, the most common cause of encephalitis.

DIFFUSE ENCEPHALITIS.

ETIOLOGY.—It occurs most frequently after head injuries. The non-suppurative type is especially common in young children. Cases occurring in adults are often apparently due to alcoholism, syphilis or influenza, although it is probable that some more active infective agent is present in every case.

PATHOLOGY.—There is no uniform inflammation of the entire brain substance. Either the disease process occurs in a number of patches or foci, or a considerable area of the brain shows diffuse inflammation. Strumpell says that within these areas there are often punctate hemorrhages. There is an emigration of leukocytes into the affected part. The tissues are hyperemic and tend to undergo degenerative changes and softening. The surrounding membranes are likely to be involved. If pus cocci are the infecting media there is an intensification of the process,

a greater massing of leukocytes around the inflamed areas, actual destruction of brain substance and an accumulation of pus that may be very great, involving in chronic cases even as much as a whole hemisphere.

SYMPTOMS.—The symptoms are much the same as those of focal inflammation. It commences with intense boring pain in the head, followed by fever, delirium or stupor, spastic muscular movements and paralysis. Mental dullness is an early symptom and persists throughout the course of the disease. In suppurative cases, to these are added those of septic infection.

DIAGNOSIS.—This is often very difficult, both from the focal variety and from meningitis. The symptoms of meningitis are much the same, and careful study is necessary for differentiation.

PROGNOSIS.—Almost invariably fatal. Non-suppurative cases may partially recover, but always with impaired intellect. The disease may terminate in two or three days or may continue for weeks.

TREATMENT.—The treatment is the same as that of the focal disease, being entirely symptomatic and palliative.

BRAIN, THROMBOSIS AND EMBOLISM OF; CEREBRAL SOFTENING.

ETIOLOGY.—*Thrombosis,* or the formation of a clot in a blood-vessel, is due to slowing of the blood current, increased coagulability, or some defect in the vessel-wall, such as atheroma, endarteritis or trauma. It is most common in the aged. Chronic alcoholism and syphilis are causes in young adults. Venous or sinus thrombosis may be due to the absorption of septic products from a neighboring inflammation.

Embolism is due to the lodgment in an artery of a fragment of exudate that has been detached from some other source and brought to it by the blood-current. Endocarditis is the usual cause, the latter often being a sequel of rheumatism; but the clot may come from the great vessels from atheroma or aneurism, or may be derived from a syphiloma. It occurs more frequently in young adults.

PATHOLOGY.—The left middle cerebral artery, which supplies

the motor areas of the brain, is the one most often closed by an embolus; next in order are the internal carotid and anterior cerebral. An embolus only occurs in an artery; a thrombus may occlude either an artery or a vein. The arteries affected are the middle cerebral, basilar, internal carotid and vertebral. Of the veins, the longitudinal and lateral sinuses and the veins emptying into them suffer most. The effect of this occlusion is to cause starvation of the brain-territory supplied, with consequent degeneration of the brain cells and chronic softening ("softening of the brain"). The result is either a cyst or replacement of the affected area by connective tissue. The pathological process is the same both in thrombosis and embolism.

SYMPTOMS.—*Thrombosis* usually comes on gradually with headache, vertigo, sensations of numbness or tingling, irritability of temper, loss of memory and increasing mental impairment. Muscular weakness is a prominent symptom, terminating in hemiplegia if the middle cerebral artery is affected, as usually is the case. This may or may not be preceded by loss of consciousness. Plugging of other vessels produces symptoms commensurate with the function of the areas which they supply. These symptoms may be very slight if the collateral circulation is good, or may include mental hebetude, bulbar paralysis or complete coma, terminating in sudden death, like that produced by cerebral hemorrhage.

Embolism is sudden in its onset and preceded by no premonitory symptoms. Mild cases may be attended only by vertigo, vomiting, slight shock and hemiplegia, usually of the right side; but in most cases there is unconsciousness. This is often of brief duration, but it may deepen into coma from which the patient never recovers. Other cases manifest, instead of the apoplectic symptom, convulsions or delirium.

The later symptoms of both thrombosis and embolism are practically identical and are similar to those of cerebral hemorrhage. The most prominent symptom is the hemiplegia, which with aphasia remains for weeks or months, and may become permanent. Bulbar paralysis, when present, interferes with speaking, swallowing, masticating and breathing. The evidences of mental deterioration are in all severe cases painfully manifest.

DIAGNOSIS.—It is of the utmost importance to be able to distinguish these diseases from cerebral hemorrhage (apoplexy). The following table will prove of assistance:

	HEMORRHAGE.	THROMBOSIS.	EMBOLISM.
Usual age.	Occurs in late adult life.	A disease of old age.	Most common in young adults.
Predisposing causes.	Cardiac hypertrophy; atheroma; high arterial tension; excitement or overexertion.	Diseases or injuries of vessel walls; depraved conditions of blood; *low* arterial tension; not caused by excitement but favored by sleep.	Cardiac disease; recent or old endocarditis, with or without valvular disease; follows rheumatism; arterial tension low.
Prodromata.	Usually but not invariably absent.	Pronounced; increasing in severity.	No prodromata.
Onset.	Sudden with coma which is prolonged and marked with stertor.	Gradual; coma slight or wanting; stertor not common.	Sudden; coma usually less deep and shorter than in hemorrhage; little or no stertor.
Attack.	Face congested; pulse slow and full; temperature elevated.	Face pale; pulse weak and often rapid; temperature normal.	Face pale; pulse normal or weak and often irregular; temperature normal.
Paralysis.	Follows coma; motor recovery rapid.	May occur without coma; tends to increase — slow improvement.	Precedes coma; slow improvement except in mild cases which may be followed by complete recovery.
Mental results.	Brain recovery usually good.	Increasing mental impairment.	Often mental impairment.

PROGNOSIS.—Thrombosis is usually progressive; it eventually terminates fatally in most cases. Mild cases of embolism often end in recovery, but the tendency is toward softening and death. Severe acute attacks may terminate in a few days, the patient never emerging from the coma.

TREATMENT.—It is important in undertaking the treatment of one of these cases to establish the diagnosis carefully. This

is made doubly necessary by the fact that the indications for the treatment of cerebral hemorrhage, with which embolism or thrombosis is most likely to be confused, are distinctly different, —in some respects diametrically opposite from that of the last-named diseases. Cerebral hemorrhage is a disease of high arterial tension. The heart impulse is strong and the cerebral vessels so full and tense with blood that their weakened walls finally give away. Treatment, therefore, demands sedation of the circulation. In embolism and thrombosis arterial pressure is lowered by cardiac disease or by debility. Stasis of the current favors the accumulation of blood-clot at the affected or adjacent points. Treatment demands a strengthening of the heart and a re-establishment of the blood-supply within the diseased area. The patient, during the attack, should be put to bed and kept absolutely quiet, with the head and shoulders slightly raised. If there is shock, hot-water bottles may be placed at the extremities. To maintain the action of the heart, ammonium carbonate is generally prescribed in 5-grain doses every two to three hours. It may be given in this form:

Ammonium carbonate .....gr. 5
Liquor ammonium acetate.....dr. 1

Bartholow recommends: Ammonium carbonate, grains, 10, and ammonium iodid, grains 5, to be taken three times a day. He believes that this not only stimulates the heart but assists in the solution of the plug. Strychnin, hypodermically or by the mouth, is a very useful drug during the attack, and digitalis, strophanthus, and even alcohol if given judiciously in small repeated doses, are often of decided value. Venesection should never be resorted to, while violent purgatives are absolutely contraindicated. The bowels may be regulated, when necessary, by the use of gentle laxatives. Symptoms of cerebral irritation, such as convulsions, require the use of bromids.

The possible presence of syphilis in any case should not be overlooked. If there is reason to suspect a previous specific affection, the iodids should be used persistently and in large doses, unless cardiac disease is present. Heart troubles, rheumatism, gout or any other coexistent diseases should receive appropriate treatment.

It is important to raise the standard of the patient's health.

During convalescence rest in bed should be required, nutritious foods given, supported by cod-liver oil, tonics of iron, arsenic and strychnin, with such gentle alcoholic or other stimulants as the necessities of the case may dictate. The iodids, mercury and ammonium salts are prescribed, as already noticed, to promote absorption. Swedish movement, massage, light exercise and electricity are sometimes useful in the treatment of the paralyzed limbs.

BRAIN, TUMORS OF.

ETIOLOGY.—Tumors of the brain usually occur during middle adult life, but tubercular tumors are more common in children. The cause of new-growths in this location, as elsewhere, is obscure, except in cases of aneurism, tuberculosis and syphilis.

PATHOLOGY.—Tumors of the brain may be either benign or malignant, and may arise from the membranes, blood-vessels or brain-substance. Anders arranges the most common varieties according to their relative occurrence as follows: (1) tubercle; (2) sarcoma; (3) glioma; (4) gummata; (5) carcinoma; (6) fibromata. Other forms are osteoma, enchondroma, myxoma, lipoma, angioma, cholesteatoma, hydatids, cysticerci, brain-cysts and aneurisms. Brain-tumors may be single or multiple and vary greatly in size. Enormous tumors sometimes produce only slight symptoms, while, on the contrary, small tumors may produce very serious ones. This depends upon location and the amount of irritation, pressure and disturbance of nutrition which they produce.

SYMPTOMS.—The symptoms are (a) general, or those indicating the presence of a tumor, and (b) focal, those indicating its location.

The General Symptoms include: (1) Intense headache, which is almost invariably present, usually generalized, often most pronounced in the morning and prone to subside when paralytic symptoms have developed or the intra-cranial pressure has been relieved by drainage. If the tumor is angiomatous or aneurismal, the headache is throbbing, synchronous with the heart's action and increased by exertion. (2) Optic neuritis occurs in about 80 per cent of all cases. It may be unilateral or bilateral, may occur suddenly, and is sometimes associated with sudden blind-

ness. (3) Vomiting is a common symptom, has no direct relation to the time of taking food, and is occasionally projectile. It is especially severe in cerebellar tumors, in those located posteriorly and those affecting the ocular or auditory apparatus. (4) Vertigo is an early symptom and is likely to be present in tumors involving the optic and auditory apparatus or the posterior cerebral or cerebellar portions of the encephalon. (5) Mental sluggishness is present to a greater or less extent in nearly all cases. This may occur only as apathy, indifference and forgetfulness, or may pass into lethargy, and terminate in coma. (6) Convulsions occur in about one-half of the cases, are epileptiform, usually one-sided, and tend to become static. They are often preceded by headaches or vomiting and usually followed by vomiting. Complete unconsciousness is rare. Less constant symptoms are variations of the pulse and respiration, occasional slight delirium and insomnia.

The Focal Symptoms are referable to the function of the part affected, and are, briefly, as follows: (1) Prefrontal region—Headache, drowsiness, mental dullness, impairment of sense of smell. (2) Motor region—Muscular spasms (Jacksonian epilepsy), disturbances of sensation, paralysis. (3) Parietal region—No symptoms, or word-blindness or mind-blindness. (4) Temporal region—Disturbance of taste or smell, word-deafness. (5) Occipital region—Blindness of one or both eyes, mind-blindness. (6) Corpus callosum—Motor disturbance. (7) Corpora quadrigemina and crura—Oculo-motor paralysis on side of tumor, hemiplegia on other side, sensory disorders. (8) Base of the brain (a) in anterior fossa—Exophthalmos, with disorders of vision and smell; (b) middle fossa—Oculo-motor paralysis and facial neuralgia; (c) basal ganglia—Hemiplegia, sensory disturbances, hydrocephalos. (9) Cerebellum—Headache, projectile vomiting, vertigo, marked incoordination. (10) Pons and medula—Cranial nerve affections, variations in pulse and respiration, hemiplegia.

Diagnosis.—A brain tumor may usually be differentiated from meningitis and encephalitis by absence of fever or inflammatory symptoms and by its gradual onset. Localization may be determined by a careful study of the focal symptoms.

Prognosis.—Invariably fatal except in tubercular or syphilitic

cases. In these the outlook is always extremely grave. It may persist for months or years.

TREATMENT.—Resort should be had to the iodids or to mercury in every case, except those undoubtedly tubercular, since the possibility that the case is syphilitic offers almost the only gleam of hope. The iodid of potassium given in large doses is the most effective remedy. Commence with 20 to 30 grains three times a day and increase with the patient's tolerance to 150 grains or more daily. Mercurial inunctions and the internal use of the bichlorid $^1/_{24}$ to $^1/_{12}$ of a grain, may be tried either in association with the iodid of potassium or alone. The latter, however, is the most satisfactory.

Tuberculosis should be treated as in other portions of the body, with careful diet, outdoor life, exercise and the medicinal measures which promote nutrition and raise physical tone. These include cod-liver oil, maltine, malt extracts, iron, arsenic and strychnin. Creosote and its derivatives are sometimes useful.

For the relief of the pain the bromids and the opiates must often be resorted to. Acetanilid, phenacetin, antipyrin and drugs of this class are often extremely useful. Relief from intracranial pressure is sometimes obtained by the use of leeches, and the ice-bag may be found comforting. Any emotion, excitement or physical or mental stimulation increases the pressure and should be interdicted.

As a means of surgical relief Quincke's lumbar puncture and withdrawal of cerebro-spinal fluid has been advocated. Exploratory operation, as offering the only hope of relief, should be resorted to if the tumor is accessible and after remedial measures have failed.

BREAK-BONE FEVER—See Dengue.

BRIGHT'S DISEASE—See Nephritis.

BRONCHITIS.

DEFINITION.—Inflammation of the bronchial mucous membrane. An acute attack is popularly called a "cold on the chest."

VARIETIES.—There are two common varieties, acute and chronic. Fetid and fibrinous bronchitis are other types of the disease.

ACUTE BRONCHITIS.

ETIOLOGY.—It is due usually to "taking cold" and is most likely to occur during late autumn, winter or early spring. It is sometimes associated with other diseases, notably measles and whooping cough, and may be caused by local irritants, as the inhalation of certain drugs, dust, ether and other irritant vapors. The underlying cause is undoubtedly the presence of infective microorganisms. It should be remembered that according to Haig many of the recurring cases are due to lithemia.

PATHOLOGY.—The mucous membrane of the bronchi is red, inflamed and thickened and its surface covered with mucus or muco-pus. The tissues are infiltrated with leukocytes, the mucous glands are much swollen and there is considerable exfoliation of the epithelial cells.

SYMPTOMS.—Frequently commences as a coryza or "cold in the head." The active symptoms of the disease are usually preceded by a sense of malaise and chilliness, followed by a slight fever. In mild cases this is hardly noticeable, but when more severe the temperature may reach 101° to 103° F. Coincidently the pulse and respiration become quickened, and headache, general muscular pains and discomfort develop. The respiratory symptoms consist of a feeling of constriction in the chest and pain and tenderness under the sternum, giving the sensation of "rawness." This pain is increased by the ever-present cough, which is at first dry and tearing, and associated with little or no secretion. Within a day or two the cough becomes loose, some mucus is raised and amelioration of the symptoms follows. If the smaller bronchi are affected there is considerable dyspnea.

The symptoms are generally exaggerated in children and are sometimes alarming. In the aged they are often masked, debility is marked and the disease tends to assume a subacute or chronic type.

PHYSICAL SIGNS.—On inspection a slightly increased rapidity of respiration will be noted. Palpation sometimes reveals, especially in children, a bronchial fremitus. On auscultation, in the early stages of the disease, there are sibilant rales. With

the development of the secretion they become more apparent, and are moist, mucous and bubbling.

DIAGNOSIS.—Little difficulty will be experienced in the diagnosis, though in onset and general symptoms the disease may simulate influenza, pneumonia or bronchopneumonia. It is in most cases readily differentiated by careful physical examination.

PROGNOSIS.—The prognosis is usually good. In very young children the disease frequently proves fatal, the danger decreasing as the child grows older. In the aged and debilitated it may rarely prove fatal. It not infrequently results in permanent changes in the bronchi, resulting in a persistent chronic form of the disease.

TREATMENT.—In every case where the patient is seen early an effort should be made to abort the disease. That this may be done in many cases is the general testimony of practitioners. For this purpose a full dose of Dover's powder (10 grains) given preferably at bed time, hot drinks, as lemonade or ginger tea, with a hot vapor or foot bath, or where it is accessible a Turkish bath, will often be found sufficient. Great care should be taken to avoid exposure during the relaxation of the skin produced by these measures. The patient should be put to bed, clothed in or covered by flannel.

Quinin is by many considered a specific in "breaking up colds." It should be given in full doses for this purpose. In children aconite is peculiarly valuable, given in small frequently repeated doses. It may be combined with citrate of potash or the spirit of nitrous ether in a simple febrifuge and diaphoretic, as:

Tinct. aconite	gtt. 3
Spts. nitrous ether	dr. 4
Syrup tolu	oz. 1
Water, enough to make	oz. 4

A teaspoonful every hour, for child two years old, till skin is moist, then every two hours.

The following combination will often prove of value in the early stages and may succeed in aborting the disease:

Tinct. aconite	gr. 1
Quinin sulphate	gr. 12
Dover's powder	gr. 24

Make into 12 capsules. One every three hours.

Other prescriptions useful during this stage are:

Quinin sulphate .....gr. 3
Codein .....gr. $\frac{1}{8}$

One capsule every three hours.

For "walking colds" Danforth prescribes:

Quinin sulphate .....gr. 1
Camphor .....gr. 1
Dover's powder .....gr. 3

One such capsule every three hours.

Pilocarpin ($^1/_8$-$^1/_2$ grain) hypodermically is recommended to abort a severe cold. It produces great and sometimes exhausting perspiration, and should be used with care and only on adults of good physical strength. Bartholow recommends it in the following pill:

Pilocarpin hydrochlor. .....gr. $^1/_{12}$
Picrotoxin .....gr. $^1/_{40}$

This dose every two hours.

When the disease has developed efforts should be made to ameliorate the severity of the symptoms. To secure this it is necessary to bear in mind the inflammatory condition of the mucous membrane. We desire to relieve its irritability, quiet the distressing cough, which is of itself often a factor in maintaining the local congestion, equalize the circulation, relieve the local vascular tension in the inflamed tissues, and re-establish secretion. The breathing of moist vapor relieves the distressing sense of "rawness" and is useful, especially in children. The addition of a teaspoonful or more of compound tincture of benzoin to a shallow vessel containing hot water kept in the room on the back of the stove or on the register or steam coil will be found to give an agreeable balsamic odor and help give comfort to the patient.

Locally it is an excellent plan to rub into the chest warmed camphorated oil, after which dry hot flannels or the pneumonia jacket of cotton batting, should be applied. The addition of turpentine makes this more stimulating, as follows:

Oil turpentine .....oz. 1
Camphorated oil .....oz. 3

The amount of turpentine should vary according to the patient's age and the sensitiveness of the skin.

Internally it is well to commence treatment with a brisk

purge. This relieves the vascular tension and in popular parlance helps to "work off the cold." A moderate dose of calomel, followed by castor oil or an aperient mineral water is most effective.

During the feverish stage aconite is one of the most valuable drugs. This may be combined in some simple expectorant mixture. The drugs used in these mixtures comprise diuretics and diaphoretics, such as spirit of nitrous ether, acetate of ammonium, and citrate or acetate of potassium: the nauseating expectorants, such as ipecac, tartar emetic, apomorphin; cough sedatives, such as opium and its alkaloids, morphin, codein and heroin; and hydrocyanic acid (as in syrup of wild cherry bark and cherrylaurel water). By their use the circulation is equalized, the inflamed mucous membrane relaxed and the secretory stage hastened. The following are types of prescriptions of this class:

Tinct. aconite	m. 24
Syrup ipecac	dr. 6
Syrup tolu	dr. 6
Sol. ammon. acetat, enough to make	oz. 6

A dessertspoonful every hour. If cough is very troublesome a small amount of paregoric may be added.

Tinct. veratrum virid	m. 10
Comp. syrup squills	dr. 2
Syrup tolu	dr. 14

One dram every two to four hours for a child 5 years of age. —Lewis Smith.

Potassium citrate	oz. ½
Apomorphin hydrochlor.	gr. 1
Syrup ipecac	oz. ½
Lemon juice	oz. 2
Syrup	oz. 4

A dessertspoonful in water every three hours.—Woods.

Codein sulph.	gr. 3
Wine antimony	dr. 2½
Spt. nitrous ether	dr. 5
Spt. chloroformi	dr. 4
Fl. ex. licorice	dr. 1
Syrup tolu, enough to make	oz. 4

A teaspoonful every three hours.

Other very useful preparations either alone or in combination with other expectorants are brown mixture and syrup of white

pine compound. Both of these are palatable and well suited for children. In young children tartar emetic given in small frequently repeated doses ($^1/_{50}$ to $^1/_{20}$ grain) is very effective. Or the following may be used:

Brown mixture .....cz. 1
Syr. lactucarium .....oz. 3
One-half to one teaspoonful every two or three hours.

Sometimes a tablet or triturate is to be preferred, in which case the brown mixture tablet or lozenge, having the following formula, is good:

Ext. licorice .....gr. $^9/_{10}$
Benzoic acid .....gr. $^3/_{200}$
Antimony and potass. tartrate.....gr. $^3/_{400}$
Powd. opium .....gr. $^3/_{200}$
Camphor .....gr. $^3/_{200}$
Oil anise .....m. $^3/_{200}$

For the headache and muscular pain phenacetin, lactophenin, antipyrin or acetanilid may be given in suitable doses. The addition of an equal amount of salol or the salicylates is often valuable in cases of this character, bearing in mind the gouty feature in many patients.

As the secretion develops resort may be had to a stimulating expectorant. The chlorid of ammonium is especially valuable in most cases, and may be added to various combinations of expectorants. It seems to loosen sticky mucus and facilitates expectoration. Ipecac is peculiarly useful, not only in establishing secretion but in regulating its quantity when excessive.

Ammonium carbonate is best suited to old or debilitated cases where something more stimulating is desired. Squill, senega, sanguinaria, terpin hydrate, terebene, tar and eucalyptus are all useful drugs in this stage. The following prescriptions are recommended:

Ammonium chlorid .....dr. 2
Syr. Dover's powder.....oz. 1
Syrup senega, enough to make.....oz. 4
A teaspoonful every three hours.—Danforth.

Ammonium chlorid .....dr. 1
Comp. syrup squills.....dr. 4
Paregoric .....dr. 4
Water, enough to make.....oz. 3
A teaspoonful every two or three hours.

Morphin sulphate .....gr. 1½
Potassium cyanid .....gr. 1½
Terpine hydrate .....gr. 40
Oil eucalyptus .....dr. 1
Make 20 capsules. One every two hours.

Codein sulphate .....gr. 1
Ammonium carbonate .....gr. 80
Syrup tar .....oz. 1
Syrup wild cherry bark.....oz. 1
Water, enough to make.....oz. 4
A dessertspoonful every three hours.

A palatable elixir of codein and terpin hydrate is now offered for sale. Terebene may be given in 5-drop doses on sugar, this to be increased to 10 drops three times a day.

In young children, who are unable to expectorate, accumulations of mucus often cause marked dyspnea. In these cases the administration of an emetic dose of the syrup or wine of ipecac will occasionally be necessary to rid the air passages of the obstruction.

The following will be found useful in the second stage of the disease in children:

Ammonium carbonate .....dr. 1
Ammonium chlorid .....dr. 2
Spt. chloroform .....dr. 2
Wine ipecac .....dr. 4
Comp. licorice mixture, enough to make....oz. 3
One-half to one teaspoonful every three or four hours.

Cases of bronchitis that are slow in convalescence are benefited by the use of potassium iodid. This serves to liquefy the sputum and hastens resolution. It is given usually in expectorant mixtures, as in the following:

Potassium iodid .....dr. 2
Syr. senega .....oz. 2
Syr. wild cherry bark.....oz. 2
A teaspoonful every four hours.

Syrup of Dover's powder or paregoric may be added if cough is troublesome.

In cases where the cough persists and expectoration is copious, purulent or offensive, Danforth recommends the balsams of tolu or Peru, given in 10 grain or 10 minim doses in emulsion, with a little paregoric to quiet the cough.

As a tonic expectorant in debilitated cases during convalescence Bruce recommends:

Ammonium carbonate	gr. 3
Tinct. nux vomica	m. 5
Spt. chloroformi	m. 10
Infus. quassia, enough to make	oz. 1

This dose three times a day before meals.

CHRONIC BRONCHITIS.

ETIOLOGY.—This frequently follows an acute attack or may occur in connection with chronic diseases, such as asthma, emphysema, tuberculosis, gout, and diseases of the heart and kidneys. It is essentially a disease of old age.

PATHOLOGY.—The morbid changes depend upon the character of the causative malady. There may be thickening of the mucous membrane with leukocytic infiltration and increase of the connective tissue elements, or atrophy of the mucous membrane with thinning of its layers and varying degrees of dilatation (bronchiectasis). Sometimes there is infiltration of surrounding connective tissue, causing fibroid disease of the lung. There may be ulceration.

SYMPTOMS.—Usually this disease comes on insidiously. Cough is the most prominent symptom, and this is frequently associated with considerable "puffing" or shortness of breath on exertion. This cough does not cause pain, is worse in the morning, after meals or at night, and is accompanied in most cases by more or less profuse secretion of thick yellowish or greenish mucus, which is sometimes slightly streaked with blood. The cough is not constant, but varies with the weather or season, frequently disappearing entirely in the summer only to reappear in the fall and persist through the winter. In the "dry" form of the disease there is no expectoration, but a troublesome cough.

Bronchorrhea is a form of the disease in which there is excessive expectoration. This may be thin or watery, but it is usually purulent, thin and contains greenish masses. Occasionally it is thick. The quantity of mucus raised is sometimes enormous.

Fetid bronchitis is due to retention and decomposition of the secretion in connection with bronchiectasis or cavities in the

lung. The sputum has a characteristic odor and is expectorated in large quantities. Chills and elevation of temperature are more or less constant accompaniments.

Fibrinous bronchitis is an extremely rare affection, and is characterized by the occurrence of paroxysms of cough followed by the expectoration of well-formed fibrinous casts of the bronchi, sometimes very extensive in size. It may be acute, with high temperature, but usually occurs in the form of paroxysms, which recur from time to time. Its course extends sometimes over a period of many years.

PHYSICAL SIGNS.—The physical signs of chronic bronchitis are not marked, aside from its complications. In many cases there is an associated emphysema or bronchiectasis. Rales may be heard on both sides of the chest. These are often very loud, give a characteristic fremitus and are sibilant, sonorous or mucous, according to the quantity of secretion.

DIAGNOSIS.—Chronic bronchitis is not infrequently mistaken for pulmonary phthisis. Complicating conditions make diagnosis more difficult. The accompanying table may give assistance:

CHRONIC BRONCHITIS.	PHTHISIS PULMONALIS.
Tubercular history usually absent; often follows acute attack.	Tubercular history in most cases; may follow bronchitis.
A disease of old age.	Most frequently in young adults.
No fever.	Afternoon rise of temperature.
Emaciation absent or slow; general health not much impaired. Marked emaciation in bronchiectasis.	Rapid emaciation; increasing debility.
Slight dyspnea, except in bronchiectasis, when it is marked.	Dyspnea on exertion.
No signs of consolidation; dilated bronchi may simulate cavity.	Physical signs of consolidation.

PROGNOSIS.—The hope of complete recovery depends upon the cause, but is usually slight, since the disease produces permanent changes in the bronchial structure. It does not of itself

cause death, and may exist for years without apparent change. Prolonged bronchitis usually causes bronchiectasis and emphysema.

TREATMENT.—The difficulties in the way of effecting a cure are very great. As Bruce says: "It is nothing less than to subdue chronic inflammation of an extensive mucous membrane, to repair ulcerated areas, to promote absorption of thickening of the tubes, to restore muscular tone and elasticity in the walls of the bronchi and in those of the chest; to undo secondary changes in the lungs and circulation; and to do all these in organs which can not rest, in tubes which are especially constructed to resist closure, and in subjects who are always debilitated and frequently unsound." Much, however, can be done to give relief and cures are occasionally effected.

Treatment should be directed, first, to the causative malady. This is often a defective heart. The tone of that organ and of the general circulation should be raised by suitable therapeutic measures. The general health of the patient is of great importance. Where possible, he should reside during the colder months in a warm, equable climate, as California, Arizona, Florida or the pine regions of Georgia or South Carolina. If expectoration is profuse the drier climate should be chosen, while the moist air of sea-level will suit best the cases of dry catarrh.

Persons subject to this disease should dress warmly in flannel, avoid sudden changes and exposure, since they are very prone to "take cold." Occupations that bring them into unhygienic surroundings should of course be given up, sufficient exercise taken in the open air and the life throughout conducted on temperate, moderate and hygienic lines.

Remedies that raise the tone of the body and stimulate nutrition are of great value. Cod-liver oil, maltine and malt preparations, iron, the hypophosphites, strychnin and the tonic bitters are all useful in properly selected cases.

The local indications are, to relieve the congested bronchial vessels and restore, as far as possible, a normal nutritional circulation; to unload the tubes of the accumulation of irritant secretion and to maintain them in an aseptic condition; and to relieve troublesome symptoms, especially the cough.

These indications are met in part by drugs which raise the

blood pressure, check vascular stagnation and favor in one way or another removal of the secretion, usually by liquefying the sputum. Drugs of this class include ammonium carbonate and chlorid; potassium iodid; squill, senega, the balsams of tolu and of Peru; copaiba and the tarry preparations; turpentine, terebene, creosote, guaiacol and the aromatic oils. The last named series are also valuable antiseptics, and serve to check bacterial decomposition in the retained secretions. In a general way it may be said that the alkaline preparations are most valuable when secretion is scanty and tenacious, the balsamic when it is profuse. The ammonium compounds are extremely valuable, but may upset digestion. The following rule of Packard (Sajous' Cyclopedia) is a good guide as to their use: "Where the expectoration is scanty and the sputum viscid, the chlorid is to be used; where the right heart is laboring, the carbonate acts best; when there is indigestion, and especially flatulent distention, the aromatic spirit is preferable." The following prescriptions are suggested:

Ammonium chlorid .....dr. 2
Fl. ext. licorice.....oz. 1
Syrup tar .....oz. 1
Chloroform water, enough to make.....oz. 4
A teaspoonful every three hours.

Ammonium carbonate .....dr. 1
Tinct. squill .....dr. 4
Tinct. senega .....dr. 4
Paregoric .....oz. 1
Syrup tolu .....oz. 1
Water, enough to make.....oz. 4
Teaspoonful every three hours.—Stokes.

Arom. spt. ammonia.....dr. 2½
Syr. squill comp.....dr. 4
Paregoric ..... dr. 4
Water, enough to make.....oz. 3
Two teaspoonfuls every three hours.—Gould's Cyclopedia.

Potassium iodid is of special value where there is a gouty element and for the purpose of reducing the hyperplastic condition of the bronchial walls. It is a valuable expectorant, raises blood pressure, liquefies expectoration and stimulates excretion. Danforth recommends:

Potassium iodid .....dr. 2½
Syrup tar .....dr. 4
Syrup Dover's powder.....oz. 1
Syrup tolu .....oz. 4
A teaspoonful four times a day.

Dover's powder is seldom suited for prolonged administration and may be profitably replaced by paregoric, codein or heroin.

The balsams and turpentines are extremely useful in this disease. They should be given in small doses continued over a long period.

Strychnin sulphate .....gr. ½
Codein .....gr. 6
Terebene .....dr. ½
Oil santal .....dr. ½
Make into 12 capsules. One every three hours.—Stevens.

Copaiba .....dr. 3
Paregoric .....dr. 6
Syrup acacia, a sufficient quantity.....
Peppermint water, enough to make.....oz. 6
A tablespoonful four times a day.

Terebene in 5-drop doses may be taken in capsules or dropped in a little sugar, oil of turpentine in emulsion with sedatives and suitable expectorants, and santal and copaiba in soft capsules; creosote or guaiacol will be found very valuable in many cases.

One of the most satisfactory measures is the inhalation of vapors containing the balsamic or turpentine preparations. These may be put in boiling water, or, better, used through a nebulizer with a compressed-air apparatus. Some suitable formulas follow:

Creosote .....dr. 1
Eucalyptol .....dr. 1
Comp. tinct. benzoin.....oz. 2
One teaspoonful in a pint of boiling water.

Eucalyptol .....dr. 1
Thymol .....dr. 1
Camphor .....oz. 1
Oil turpentine, enough to make .....oz. 2
One teaspoonful in a pint of

Eucalyptol
Menthol
Turpinol
Essen

A few drops of the mixture are to be placed in a large bottle and heated gently over the flame of a spirit lamp. When the bulb becomes filled with the vapor, the latter is drawn by the patient through the nose by means of a tube with a flaring end.—Kafemann.

Camphor	dr. 1
Oil tar	dr. 2
Iodin	gr. 20
Creosote (beechwood)	dr. 1
Menthol	gr. 30
Balsam Peru	dr. 1
Tinct. benzoin	oz. 4

This is useful in a nebulizer.

The small Denison inhaler recommended in the article upon tuberculosis is a convenient way of using the balsamic and similar drugs. Any of the above formulas may be used in it.

In *bronchorrhea* the treatment is in general the same as that already outlined, but there is special necessity in most cases for tonic and reconstructive measures. The balsams of Peru and tolu, Canada balsam, terebene, oil of turpentine, copaiba, eucalyptol and remedies of this class are generally useful. Sometimes astringents, such as gallic acid, may be added to advantage, and a mild opiate may be combined with them to check excessive cough. The inhalants already given are of decided advantage. The ammonium salts, iodids and expectorants have little value in these cases.

Fetid bronchitis is naturally associated with dilated bronchi and retained secretions, and its treatment is, therefore, practically the same as that of bronchorrhea. The balsams, turpentines, creosotes, terebene and santal are recommended. Narcotics should generally be avoided.

Dry catarrh occurs usually in elderly people with emphysema and is practically incurable, though capable of being benefited. The nauseating expectorants are generally recommended, to be given over a long period of time, in small doses. Ipecac, tartar emetic, apomorphin, lobelia and Kermes mineral are used. Dover's powder, combined with small doses of capsicum, is recommended by Danforth, who also praises lobelia, as in the following:

Tinct. lobelia .....dr. 1½
Paregoric .....dr. 4
Syr. wild cherry, enough to make.....oz. 2
A teaspoonful every three hours.

In *plastic bronchitis* the treatment is the same as in the acute and chronic forms of the disease. The clearing of the bronchi of casts is probably favored by the use of the iodids and carbonates, which produce liquefaction. These give the most general satisfaction. Inhalants are recommended along the same lines as already described.

BRONCHOPNEUMONIA—See Pneumonia, Lobular.

BUBO.

DEFINITION.—A bubo is an inflammatory enlargement of a lymphatic gland. It may occur in any portion of the body, and from many causes, but the term is usually applied to the venereal tumor found in the inguinal region.

ETIOLOGY.—It occurs as a complication of gonorrhea, chancroid and syphilis. In gonorrhea it is by no means constant, nor is it universally present in chancroid, but in syphilis some enlargement of the lymphatic glands is practically always present.

SYMPTOMS.—The condition is easily recognized. An examination of the groin shows the presence of one or more glandular enlargements. These vary greatly in size, may be single or multiple, hard or soft and may terminate by resolution or suppuration.

In gonorrhea the gland shows little tendency to suppurate, and the same is true of syphilitic buboes, which are usually hard, multiple and bilateral. The bubo accompanying chancroid is most to be dreaded because it is likely to break down; indeed, it sometimes causes a formidable abscess, which heals slowly, leaving a fistulous opening through which dirty pus discharges, and since this pus is often inoculable it may serve to spread the disease. The chancroidal bubo is usually unilateral and is more likely to be single.

TREATMENT.—When the bubo is recognized early, an effort should be made to abort it. Various applications have been used for this purpose. A gauze compress soaked with bichlorid solution (1 to 2000) may be applied, or the overlying skin may

be painted with tincture of iodin or covered with mercurial ointment and tightly bandaged. Indeed, compression alone sometimes proves effective. The part is covered with a bunch of loose gauze and a spica bandage is snugly applied over it, or, better still, a flat, dry sponge is used, which is wet after the dressing is in place. The expansion of the moistened sponge makes uniform pressure. Some recommend placing a shot-bag over the bubo when the patient can be kept in the recumbent position.

But the best method of treating a bubo probably consists in applying antiseptic or alterative medicaments to the skin and then putting a tight bandage over the dressing. Christian (Therapeutic Gazette) recommends the following ointment, which he has used successfully in aborting all forms of venereal bubo:

Mercurial ointment .....dr. 2
Belladonna ointment .....dr. 2
Ichthyol .....dr. 2
Lanolin .....dr. 2

If the bubo be seen early, no heat or redness being present, a piece of surgical lint spread with the ointment is applied directly to the swollen gland; over this is placed a piece of oiled silk of the same size. A large pad of cotton is next applied, and firm continuous pressure is obtained by the application of a wide spica-of-the-groin bandage, two bandages being employed. This treatment is applied every other day until, in cases in which it acts successfully, entire resolution of the bubo is accomplished—usually a period of ten days to two weeks.

Similar to this is the following, recommended by Thornton; it may be used in the same way:

Mercurial plaster .....dr. 4
Lead plaster .....dr. 4
Oil turpentine .....dr. 1
Ichthyol .....dr. 2

Slight compression and counter-irritation may be made by painting the bubo with collodion in some such mixture as the following:

Iodin .....dr. 1
Canada turpentine .....dr. 1
Collodion .....oz. 4

Apply with soft camel's-hair brush once daily until slight rubefaction is produced.—Shinn.

Leeches have also been much used to reduce the local congestion, but it is important to follow the directions of Sturgis and Cabot, to never apply them directly over the bubo, since there is some danger of infecting sound tissue.

Thornton recommends the injection of carbolic acid to abort the bubo. It must be employed as soon as swelling and pain are observed. The following formula is used:

Carbolic acid	gr. 8
Distilled water	oz. 1

Inject 10 minims into the bubo after anesthetizing with a spray of ethyl chlorid or ether.

Welander prevented suppuration in thirty out of thirty-three cases by injecting the following:

Mercury benzoate	gr. 5
Sodium chlorid	gr. 2½
Water	oz. 1

If in spite of these applications the bubo proceeds to suppuration, the abscess cavity must be opened as soon as fluctuation is observed. The part should be shaved, then made antiseptic in the usual way, and after anesthetizing the point of insertion with a drop of pure carbolic acid, a thin bistoury is forced directly into the cavity. The pus is then evacuated as thoroughly as possible and the wound washed out with a solution of hydrogen peroxid; this is followed by irrigation with a weak bichlorid solution (1 to 5000). If the bubo is a large one, and there are intercommunicating chambers, it should be opened widely, all septa broken down and debris removed with the curette, after which it may be irrigated with the peroxid and bichlorid solutions, as just directed, and packed with iodoform gauze.

BUBONIC PLAGUE; THE PLAGUE; BLACK DEATH.

Definition.—An epidemic, contagious disease, characterized by high fever, glandular swellings, rapid course and high mortality.

Etiology.—Caused by the bacillus pestis, discovered in 1894 coincidently by Kitasato and Yersin. It is a very short rod, with

rounded ends and is of the nonspore-bearing variety. It grows best in the presence of heat and moisture and in decomposing organic matter. Filth, overcrowding, unsanitary surroundings, and insufficient nourishment predispose to its appearance. The bacilli may enter the body either through the respiratory or digestive tracts, or, as is most common, through wounds or abrasions of the skin. The patient's expectoration and fecal discharges contain the germs, which may infect the dwelling, clothing, drinking water or food. It has been found that rats, mice, flies, fleas, ants, dogs, etc., may be carriers of the disease. Rats often die in large numbers during an epidemic, and are undoubtedly an important factor in the spread of infection.

PATHOLOGY.—The most prominent pathological change is in the lymphatic glands. The first to be affected are usually those of the groin, and next the axillary glands, because the site of infection is commonly either on the feet (especially in the Orient, where people largely go barefoot) or the hands, and the nearest glands suffer first; all the lymph-nodes throughout the body soon become more or less affected.

Upon examination, the infected gland is found to be swollen to several times its normal size. At first it is quite firm and hemorrhagic in the center, but rapidly softens, the cortical and medullary portions melting down into a homogeneous mass of mucilaginous or lardaceous material, teeming with the bacilli pestis, which multiply with marvelous rapidity until they constitute in many instances one-half the contents of the node. Ultimately the gland may become suppurative. The tissues surrounding the glandular nodes are found much swollen and infiltrated with hemorrhagic foci, while the blood-vessels are enlarged and the inter-vascular spaces filled with leukocytes. The blood-vessels are found to contain the bacteria in large numbers.

The spleen, kidneys and liver are increased in size, their vessels dilated, areas of hemorrhage are present; there is evidence of cellular degeneration, and bacilli are found in abundance. An important complication is pneumonia. This is said to be invariably fatal. It shows itself as a bronchopneumonia, and the changes produced are practically identical with those observed in the disease when produced by other causes. In pneumonic

plague the bacteria often reach the lung through the respiratory tract.

SYMPTOMS.—The period of incubation is usually one and one-half to three days, but, according to Haffkine, it may be as short as twelve hours, or as long as eleven days.

There are three types of the disease: (1) bubonic, (2) pneumonic, and (3) septicemic.

The *bubonic* variety commences suddenly, or after prodromal headache and vertigo lasting several hours, with a chill, followed

FIG. 3. THE PLAGUE BUBO (*Cantlie, British Medical Journal*).

by fever (102° to 106° F.). There is severe headache, occasional staggering gait and "clipped" speech suggestive of intoxication, and delirium. The pulse is at first full, but soon becomes rapid, dicrotic and thread-like. Prostration is very great. The tongue is coated early with a whitish fur, becoming brown or almost black. The mouth becomes dry and sordes collect upon the teeth. Constipation is the rule. The characteristic feature of this form is the glandular enlargement, the bubo appearing in adults first and most prominently in the groin of the affected side, in children in the cervical region. These buboes usually form within twelve hours, are greatly swollen and quite painful on pressure or extension of the limb. They may or may not

abdomen or back. It produces a more or less violent reaction, simulating the symptoms of a mild attack of the plague, and in 85 to 95 per cent of the cases confers immunity lasting two or three months; and, more than that, it reduces the mortality of those attacked from 80 to 10 or 20 per cent. The injections should be repeated from time to time, perhaps every thirty to forty days. The value of this remedy has been proven by extensive use in India, but it should be remembered that it is not protective for a week or more after inoculation.

Treatment of the Attack.—Medicinal treatment of the plague is in most cases entirely valueless. It consists mainly in supportive measures, as alcoholic stimulants, carbonate of ammonium and digitalis, with local antiseptic treatment to buboes and sores, although Cantlie does not believe in these until suppuration occurs.

The best remedy is Yersin's antipest serum. This is an antitoxin made by treating horses with progressively increasing doses of plague toxins, and at last by living bacilli, until a powerful antitoxin serum is obtained, $\frac{1}{20}$ Cc. of which will protect a mouse of 25-grams weight against living cultures and three times the mortal dose of the toxin. With this serum Yersin was able to reduce the death-rate in a number of cases which he treated in Amoy to 7½ per cent. Other observers have obtained similar results, although they have not all been quite so favorable.

While this remedy has been used to produce immunity, it is less valuable for this purpose than the Haffkine lymph, since it affords protection for only a short time and must be repeated in ten to fifteen days. For this purpose 5 to 10 Cc. are given hypodermically, with an ordinary antitoxin syringe, after antiseptic cleansing of the skin as directed for Haffkine's lymph. During the attack the Yersin serum should always be used, if obtainable. It acts quickly, produces no violent reaction, and is certainly curative in a large percentage of cases. Large doses should be used for this purpose—30 to 50 Cc. Under its influence the fever diminishes and the glandular swelling subsides. A second or even a third dose may be given if the amelioration of symptoms is not prompt.

BUNION.

DEFINITION.—An inflammatory swelling of the metatarsophalangeal joint of the great toe, due to an enlarged and thickened bursa.

ETIOLOGY AND PATHOLOGY.—Bunions are caused by wearing too tight or too narrow shoes, which crowd the toes together, thereby producing a chronic dislocation of the joint, so that the great toe makes a decided angle with the metatarsal bone. The displaced head of this bone becomes enlarged and its surface irregular, pressing upon the synovial membrane and causing a bursitis. This is subject to acute exacerbations, when the part becomes red, swollen and tender. At such times suppuration may occur. The enfeebled circulation predisposes to the formation of ulcers, especially after middle life; the ulcerative process may result in caries of the bone and disorganization of the joint.

TREATMENT.—It is essential that properly fitting shoes should be worn, long enough, broad at the sole, and with a straight inside border. Various methods have been suggested to correct a displaced joint or relieve its symptoms. Among these are (1) an adhesive strip or strap attached to the phalanges of the great toe and carried along the inner border of the foot around the heel, where it is fastened by a circular bandage; (2) a glove made to fit the toes and so held by elastic webbing as to separate them and invert the first toe; (3) the use of pledgets of cotton-wool between the second and third toes; (4) bunion "plasters," or felt rings, used to protect the joint from direct pressure; (5) metal springs which hold the toe in line with the inner border of the foot, and (6) metal soles used for the same purpose. Since inflammatory attacks are aggravated by exposure to cold when the circulation is weak, it is important that the foot should be warmly clad in the winter time.

For ordinary cases of thickening of the membrane, painting with tincture of iodin is valuable. It promotes absorption of the exudate. Shoemaker recommends the following to be used as a paint, daily:

Carbolic acid	dr. 2
Tincture iodin	dr. 2
Glycerin	dr. 2

Nitrate of silver solution (10 to 60 grains to the ounce) is a good local application; it stimulates sluggish circulation and is particularly useful in the ulcerative form. A thick paste of mercurial ointment is of value, and fly blisters may be tried in early cases. Ichthyol, in a 50-per-cent ointment with lanolin, is a most valuable remedy. If the bunion becomes inflamed, simple immersion in very hot water, or hot-compresses, with elevation of the limb, will be found comforting and effective in subduing the inflammation. The distilled extract of witchhazel is a good topical application and can be used hot or cold, as preferred. As an evaporating lotion nothing is better than lead water and laudanum (Lotio Plumbi et Opii, N. F.). Its formula is:

Lead acetate	Gm.	17.5
Tincture opium	Cc.	35.00
Water, to make	Cc.	1000.00

In case suppuration takes place it is necessary to make an incision and furnish drainage. Ulcers are to be treated, if superficial, with nitrate of silver, as already directed; if deep, by laying the bursal cavity open and the healing of the wound from the bottom, following the usual methods of antiseptic surgery. Complete cure by medicinal methods cannot be expected. To attain this it is necessary to resort to surgery.

BURNS AND SCALDS.

DEFINITION.—Injuries produced by fire or heat, and marked by acute local inflammatory reaction. Burns are produced by dry heat, scalds by hot liquids, but the lesions of both are essentially identical.

ETIOLOGY AND PATHOLOGY.—Burns are classified according to the extent of injury, as of the first, second, or third degree.

In burns of the *first degree* there is simply a superficial hyperemia of the skin without destruction of tissue. They are produced by temporary exposure to highly heated objects, usually without contact, or by the actinic rays of the sun (sunburn).

Burns of the *second* degree involve the upper layers of the skin, or epidermis, which may be destroyed. The characteristic feature is the formation of vesicles or blisters. The corium, or

true skin, is not seriously injured. Burns of this class are marked by congestion of the neighboring vessels, swelling, and serous exudate. They are usually produced by direct contact with heated metals, flames, or liquids.

In burns of the *third degree* all the layers of the skin, over at least a part of the affected area, are severely injured. In addition to this the destructive process may extend to the underlying subcutaneous tissues, the muscles, and even the bones. In every case of burn of the third degree there is considerable destruction of tissue, which is limited by an extremely vascular area. The charred parts slough off and leave a wound which heals by granulation, with the formation of a scar. These burns are caused by prolonged contact with extreme heat.

Burns of *mucous surfaces* are produced by the inhalation of flames and by contact with caustic acids and alkalies. The danger of these burns is in part that of extensive destruction of flames may cause fatal swelling and edema of the larynx.

Electric and X-Ray burns have obtained considerable medico-legal importance—more especially the latter. Their exact nature is not clearly explained. Some believe them due to actinic influence. X-Ray burns are peculiar, in that the evidences of injury may not appear for several days or even weeks after exposure, and that not only the superficial structures are injured, but inflammation and necrosis of the deeper layers may ensue. The effect seems to be essentially an injury to and inhibition of the trophic nerve supply of the part. Perhaps this explains the slowness with which these wounds heal.

Symptoms.—In burns of the first degree the symptoms are slight, consisting of redness, slight swelling and pain, all of which rapidly subside under appropriate treatment. In burns of the second and third degrees the pain is much more severe and persists for a much longer period. Shock is present in all severe cases, producing a stage of prostration lasting from eighteen to twenty-four hours. If the destruction of tissue is very large, death may be caused by shock. Occasionally it is so severe that there is obtunding of sensibility and practically absence of pain. Frequently, during this stage, there is extreme restlessness, and in children (who suffer worse than adults), convulsions, terminating sometimes in coma and death. In

ordinary cases this stage is followed by one of reaction in which the temperature, which may have been subnormal at first, becomes elevated, may rise to 104° to 106° F., where it may remain for several days until granulations form and prevent further absorption. Suppuration takes place in most severe burns; absorption of pus may lead to severe toxic symptoms, among which are hectic fever, erysipelas, septicemia, pyemia, and various other complications.

COMPLICATIONS.—These may follow severe burns of the second and third degree. The most common are bronchitis and pneumonia, either caused directly by inhalation or indirectly by absorption from surface burns; gastro-intestinal irritation, sometimes causing diarrhea and frequently resulting in the formation of duodenal ulcers; meningitis, sometimes a sequel of burns of the head; tetanus is occasionally an early symptom; congestion of the kidneys and amyloid degeneration of the viscera are others.

PROGNOSIS.—The amount of surface involved is of greater prognostic importance than the degree of injury. Burns even of the first degree, involving one-half to three-fifths of the surface of the body are likely to prove fatal; burns involving not more than one-fourth or one-third may end fatally. Extensive destruction of tissue may cause early death by shock. Children, females, and the aged suffer worst. Burns of the abdomen and thorax have the highest mortality.

TREATMENT.—*General treatment* should be addressed to the relief of pain, the relief of depression or shock, and the prevention of complications.

Pain, if severe, demands the use of opium in some form; morphin is usually the best, ¼ to ½ grain to be given by hypodermic injection. Children may take Dover's powder or paregoric. The tolerance for opium in these cases is very great. Bromid of potassium is useful if there is much excitement or restlessness.

In case of shock the patient should be placed in the recumbent position, covered well with warm blankets, and the trunk and limbs surrounded by hot-water bottles or bags, in order to restore the heat to the body. Alcoholic stimulants, as hot brandy or whisky, should be given internally, and the heart's action supported by the administration of ammonium carbonate,

aromatic spirit of ammonia or caffein in suitable doses. Hypodermically we may use strychnin ($^1/_{30}$ to $^1/_{20}$ grain) every half hour for two or three doses with or without atropin ($^1/_{100}$ to $^1/_{60}$ grain). Digitalis, brandy, ether, nitroglycerin or camphor may be used internally or by hypodermic injection. A hypodermic syringeful of camphorated oil makes a good remedy for subcutaneous use.

The danger of complications must be kept in mind, especially in extensive burns where the function of the skin is destroyed to any large degree. The other eliminative channels should be kept in good working order, the bowels properly regulated, diarrhea or constipation corrected, and the action of the kidneys watched.

Local treatment is most important and is undertaken not only for the relief of pain, but to subdue inflammation, to guard the wound from sepsis and to limit the deformity caused by the destruction of tissue.

Burns of the first degree, unless extensive, require little treatment. Relief of pain is the principal thing sought. This is accomplished by simple immersion in cold water, or by cold compresses; larger areas are reached by submersion in a slightly warmed bath. Lead water, with or without laudanum, is a satisfactory cooling lotion. A convenient remedy is a saturated solution of bicarbonate of sodium. Carron oil, carbolized olive oil or vaselin (10 per cent), olive oil and white of egg equal parts, or any bland antiseptic ointment, makes a satisfactory application.

In burns of the second and third degree it is of first importance for the relief of pain to protect the wound from the external air. A great many remedies have been used for this purpose. Besides being protective, it is important that they should be antiseptic, or at least aseptic. One of the most popular is carron oil, made of equal parts of linseed oil and lime water. The addition of carbolic acid, salol, or thymol is suggested, as in the following:

Thymol	gr. 75
Lime water	oz. 8
Linseed oil	oz. 8

Weak solutions of potassium nitrate are refrigerant and com-

[illegible] proves satisfactory in many [illegible] remedy and may be used [illegible] with an antiseptic, such as carbolic acid [illegible] per cent [illegible] thymol, menthol, aristol, europhen, or iodoform. Below are some good combinations:

Thymol	dr.	1
Carbolic acid	dr.	3
Petrolatum	oz.	8

Walton recommends:

Aristol	dr.	2
Olive oil	oz.	½
Petrolatum	oz.	½

Around the edges of the burn, after the ointment is spread, he dusts aristol in powdered form. In small burns he uses only the powder.

Boric acid	dr.	4
Antipyrin	dr.	4
Iodoform	dr.	1
Petrolatum	oz.	8

—Reclus.

Europhen	dr.	1
Olive oil	dr.	2
Lanolin	oz.	2
Petrolatum	oz.	2

Or

Bismuth subnitrate	gr.	150
Boric acid	gr.	75
Olive oil	dr.	5
Lanolin	oz.	2

If the burn is very painful the addition of a local anesthetic gives relief. One of the best of these is orthoform. It may be used as follows:

[illegible]	gr.	45
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	oz.	[illegible]

[illegible]

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
Petrolatum	oz.	[illegible]

[illegible] and may be [illegible]

linseed oil or in full strength. Wrap a layer of lint or absorbent cotton around the part and saturate it with common oil of turpentine, after which the dressing is held in place with a bandage. It often gives immediate relief, but in very large burns in which considerable absorption is possible it is best replaced by other drugs.

Gross recommended painting the burn with ordinary whitelead paint, and with this simple remedy secured splendid results; it gives immediate relief from pain in very severe cases.

Ichthyol has been much praised of late as a remedy for burns. It may be applied pure, as used by Mueller, who covers the burn with a thick layer, dusts it liberally with talcum powder, and over this places a pad of cotton held in place by a loose bandage. This causes slight burning at first, followed by complete relief. The dressing is kept in place for three to five days, unless it becomes soaked with secretion before that time. Where this makes frequent change necessary, he uses the ichthyol in ointment with vasogen. Ichthyol may also be used in watery solution (10 to 50 per cent) or in an ointment or paste in the same strength, as:

Ichthyol	dr. 4
Boric acid	dr. 2
Olive oil	dr. 2
Zinc ointment, enough to make	oz. 2

When ointments are employed, they should be used with the same antiseptic care as given to any surgical wound. The affected part should be kept scrupulously clean by frequent washing and antiseptic lotions and thoroughly dried before the unguent is applied. This should be spread on lint and covered with a surgical dressing of absorbent cotton, held in place by a rubber bandage.

On account of the difficulty of keeping the injured surface clean and aseptic when treated in this way, and because in extensive burns the ointment rather hinders than helps wound discharge and the separation of the slough, many physicians prefer the use of the dry surgical dressing, commencing with a dusting powder, sufficient in quantity to absorb the secretion if it be serous. In the milder burns boric acid, acetanilid and subnitrate of bismuth, alone or combined with talc or starch, are used; in severe burns of the second and third degree iodoform, aristol and

europhen are more commonly used, and the case is treated precisely as any other wound or injury of the skin.

The lotions used in treating burns include all the usual antiseptic solutions. One drug that has been very highly praised for this purpose is picric acid, used in saturated solution in water. Or stronger solutions made by the addition of alcohol, since it is only sparingly soluble in water, as in the following:

Picric acid	dr. 1½
Alcohol	oz. 3
Water	qt. 1

Strips of gauze soaked in this solution and applied to the part are said to give great relief and prevent the formation of ulcers. Picric acid is contraindicated in deep, old, or suppurating burns, and in very young children.

In burns of the third degree the septic process should be prevented as far as possible by irrigation with antiseptic solutions. Hot applications promote healing. Cavities should be emptied of pus, sloughs removed as far as possible, and suppurating areas cleaned with peroxid of hydrogen or other germicidal solutions. Large areas denuded of skin require skin grafting.

CALCULUS, BILIARY—See Cholelithiasis.

CALCULUS, RENAL—See Nephrolithiasis.

CARBUNCLES.

DEFINITION.—A carbuncle is an acute inflammation of the skin and subcutaneous tissues, forming an abscess much larger and more deeply seated than a boil and opening upon the surface at numerous points, giving it a sieve-like appearance.

ETIOLOGY.—The exciting cause of a carbuncle is the same as that of a boil, viz., the introduction of microörganisms into the skin by way of the sebaceous or hair follicles. Diabetes, general debility, etc., are also conditions which favor their occurrence. Carbuncles attack individuals past middle life; boils attack young adults.

PATHOLOGY.—The pathologic process is essentially the same as that of a boil, differing in degree rather than in kind. An intense inflammation, set up in a number of adjacent foci by

suppurative bacteria, causes the migration of numerous leukocytes into the affected tissues, the nutrient blood-vessels are thereby choked, thrombi form and a number of necrotic plugs are produced which ultimately coalesce. The process ends in gangrene of the entire area.

SYMPTOMS.—A carbuncle is most likely to attack the neck and back. It begins as an indurated, inflamed and painful area of moderate size and of a dark-red to violet hue. At the end of a week or ten days the skin becomes perforated at numerous points by necrotic spots, through which a bloody pus oozes. This gives it the sieve-like appearance peculiar to the disease. These suppurating points gradually spread until the entire surface has sloughed away, leaving an ulcerated cavity with well-defined borders. The pain produced by a carbuncle is severe. Constitutional symptoms are marked; there is usually some rise of temperature, and chills, fever and marked prostration are not uncommon, giving evidence of a septicemia which in the old and debilitated may prove fatal. A carbuncle may become three to six inches in diameter.

DIAGNOSIS.—The only question of diagnosis is between furuncle and carbuncle at the earliest stage, and this is of little importance since the treatment of the two conditions is essentially the same.

PROGNOSIS.—A carbuncle is always a serious affection. The danger is greatest if it is situated upon the head or neck. In the old and debilitated it often proves fatal.

TREATMENT.—An effort may be made to abort the disease by the use of various local applications in the manner described for boils. (See Boils.) These may limit the condition, but seldom do more. As soon as openings have formed all necrotic material possible should be removed, after which the pockets should be washed out with peroxid of hydrogen and the carbuncle covered with an antiseptic dressing. Or pure carbolic acid may be introduced on a probe into the affected area through the sieve-like openings or a 10-per-cent solution of carbolic acid may be injected directly into the necrotic area with a hypodermic syringe. Hot fomentations and linseed-meal poultices hasten suppuration.

Rosenbaum (N. Y. Med. Jour.) recommends the following

method of treatment: A pad of eight layers of gauze, somewhat larger than the inflamed surface, is soaked in Thiersch's solution, composed of:

Salicylic acid	dr. ½
Boric acid	dr. 3½
Distilled water	qt. 1

He covers this compress with a layer of 10-per-cent ichthyol ointment, applies it to the carbuncle, and holds it in place with rubber protective, cotton-wool and a bandage. This dressing is left for two days, after which the cores are found to have separated from their walls. According to Dr. Rosenbaum they can be painlessly removed at the next dressing.

When the carbuncle is sufficiently advanced a crucial incision should be made and the wound treated antiseptically. Better still is to put the patient under an anesthetic and remove as far as possible the entire infected tissue.

Internal treatment is mainly supportive. Strychnin, iron, and the bitter tonics are of value. Quinin is a popular drug, but its use seems to check rather than favor leukocytosis, which is essential to the fight against the disease germs. Sulphid of calcium is recommended in ⅕ to 1 grain doses every two hours to modify the suppurative process. Eclectics recommend echinacea for the same purpose (10 to 15 minims, three times a day).

CEREBRAL HEMORRHAGE—*See* Apoplexy.

CEREBRAL SOFTENING—*See* Brain, Thrombosis and Embolism of.

CEREBROSPINAL MENINGITIS; CEREBROSPINAL FEVER.

DEFINITION.—An acute inflammatory disease of the meninges of the brain and spinal cord. It is due to microbic infection and often occurs in epidemics, though sporadic cases are not uncommon.

ETIOLOGY.—As pointed out by Councilman, cerebrospinal fever is usually caused by the diplococcus intracellularis meningitidis of Weichselbaum. The pneumococcus is also found in

many cases, and it is probable that other bacteria have a causative relation to the disease. It is most likely to attack young children in the crowded tenement districts of cities or wherever the surroundings are unsanitary. It does not seem to be contagious, while its mode of transmission is unknown. It is a disease of tropical climates and prevails most largely during the winter months. Fatigue and exposure predispose to its contraction.

PATHOLOGY.—The meninges and brain are at first injected and swollen and then rapidly become the seat of an intense inflammation. The pia mater is most affected; its vessels become engorged and enlarged, the blood current is slowed, and a copious exudate is thrown out into the perivascular spaces; this finally fills the ventricles and gives rise to pressure symptoms. This exudate is at first clear and serous, but later becomes fibrinous and finally purulent. The process is essentially identical in both brain and cord, but the dorsal and lumbar region of the latter are usually the most inflamed. The posterior portion of the cord suffers more than the anterior. The exudate is sometimes so extensive as to surround the cord like a sheath throughout its entire length. The pia is thickened and frequently adherent. Extension of the process to the cranial nerve sheaths (as the optic or auditory) may set up a neuritis or perineuritis, manifested by serious disturbance of function of the part supplied. The cortical substance of the brain becomes congested and softened; the spleen, liver and kidneys may suffer degenerative changes, while the lungs may be the seat of a secondary pneumonia.

SYMPTOMS.—The period of incubation is a week or ten days. Prodromal symptoms are often wanting, or there may be some preliminary lassitude, headache, pains in the bones, joints and muscles, and perhaps nausea and vomiting. The course of the disease varies greatly, but in most cases it commences suddenly with a severe chill, or in children with convulsions, followed by fever. This is seldom typical; usually there is only a slight elevation of temperature, but occasionally it is high. The pulse is seldom greatly accelerated and may even be slow. The rate of respiration is usually increased. Headache is an early symptom; it is accompanied by pain and rigidity of the neck. The head is burrowed into the pillow and the hair worn from the occiput.

These symptoms naturally culminate in opisthotonos. The vomiting which accompanies the early symptoms is projectile in character. In mild cases the disease may terminate without further complication, but the symptoms generally increase in intensity. These usually involve mainly the nervous system.

Nervous Symptoms.—The headache is severe, but is frequently subject to remissions. It is intensified by light and sound, of which the patient is extremely intolerant. Vertigo is present in nearly all cases. Delirium is usually an early symptom, but is occasionally entirely absent, even in severe cases; it may be mild and marked principally by incoherence, or it may be wildly active, requiring restraint. Hyperesthesia of the skin is the rule, but occasionally anesthesia is found. Irritation of the motor-nerves causes muscular tremor and twitching and flexure of the joints at the shoulder, knee, elbow and hand. The eyes suffer greatly; conjunctivitis and strabismus are common, and a number of other ocular symptoms may occur; blindness is not infrequent. Ear complications include suppurative inflammation of the middle ear, intolerance of sound and ringing in the ears. Deafness is quite common and may be permanent.

Nutritional Symptoms—The appetite is often good and the digestion unimpaired, but food is swallowed with the greatest difficulty on account of spasm of the muscles of deglutition. The tongue becomes dry and covered with a brown coating. Vomiting usually occurs only at the onset. Constipation is more common than diarrhea. Emaciation is very great; the skin is drawn tightly over the bones and the sinking in of the abdomen gives it a characteristic boat-shape. The face becomes mask-like and the peculiar way of opening the mouth gives to it a hideous grin (the risus sardonicus) when the child cries. This cry is also characteristic, being high-pitched, shrill and expressionless.

Cutaneous Symptoms.—Herpes facialis, according to Anders, belongs in a peculiar sense to cerebrospinal fever. The petechial or purpuric eruption, which gave the name "spotted fever" to this disease, is often wanting.

Kernig's Sign.—An important symptom of cerebrospinal meningitis which is present in nearly every case of the disease has been fully described by several recent writers. It is elicited by raising the patient to the sitting posture and attempting to

extend the leg at right angles to the body. This will be found impossible while the patient is in this position. When the patient lies down extension is made without difficulty. The test may be made in the recumbent position by bringing the thigh at right angles to the trunk.

DIAGNOSIS.—The most accurate means of diagnosis is by making an examination of the cerebrospinal fluid which is obtained

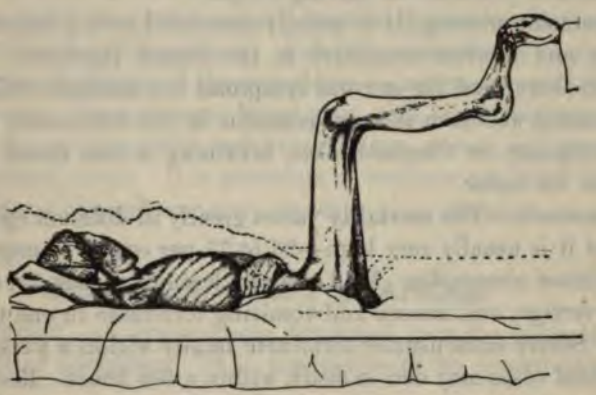

FIG. 4. SHOWING METHOD OF ELICITING KERNIG'S SIGN. (*Osler—British Med. Jour.*)

by lumbar puncture. This fluid will usually be found to be cloudy, and bacteriological examination will reveal the presence of the specific diplococcus.

Lumbar puncture consists in inserting an aspirating or antitoxin needle into the spinal canal below the third lumbar vertebra. The patient should sit up, if possible, and lean forward so as to widen the interval between the vertebrae. Under strict asepsis the needle is introduced "at a point opposite the upper edge of the lower spinous process and in a line just outside (i. e., a few millimeters from the median line). The needle is directed very slightly upward and toward the median line, with a view to having it in the median line when it enters the subarachnoid space." The escape of fluid is an evidence that the canal has been reached. This lies at a depth of 2 to 3 Cm. in children and 4 to 7 Cm. in adults. The fluid is collected in a sterile tube, 10 or 15 Cc. being usually ample for diagnostic purposes.

Pneumonia may readily be differentiated by the physical signs; when it complicates cerebrospinal fever the diagnosis is more difficult. Kernig's sign is absent.

Typhoid fever with cerebral complications shows the gradual onset, characteristic temperature range, roseola spots and Widal reaction. Absence of Kernig's sign.

Scarlet fever shows the sore throat and the diffuse eruption of that disease. Absence of Kernig's sign.

Tubercular meningitis is usually associated with a tubercular history and is often secondary to the disease elsewhere. The onset is slower and the nervous symptoms less marked, while the boat-shaped abdomen is more common in the tubercular form. The irregular, or Cheyne-Stokes, breathing is also found more often in the latter.

PROGNOSIS.—The mortality varies greatly in different epidemics, but it is usually very high—25 to 75 per cent. Young children almost always die. Mild cases with simply headache, slight fever, vertigo, and nausea and vomiting terminate in one to five days. Severe cases usually terminate fatally within a week, and malignant cases may end in death within a few hours. Recovery is slow, the fever extending over several weeks and gradually subsiding. Not the least to be dreaded are the sequelae, which include blindness, deafness, severe neuralgias of the head, chronic hydrocephalus and mental impairment.

TREATMENT.—The patient should occupy a carefully darkened room where he can have perfect quiet and be free from the possibility of disturbance. The diet should be nutritious, largely fluid, and administered at short intervals. When swallowing is difficult the nasal tube may be used. The head should be shaved, if there is much hair, and ice-bags applied to it and along the spine. Venesection has been advocated to relieve intracranial pressure, but it is of very doubtful value. Dry cups and leeches to the back of the neck or back of the ears and temples are used for the same purpose, and sometimes with advantage. Cool sponging is useful to allay the fever. Hot baths and the hot-pack are warmly recommended by a number of authors. While in the bath an ice-bag or ice-coil is kept upon the head.

Medicinal treatment is commenced with a laxative dose of

calomel. The bowels should be kept naturally open throughout the course of the disease. Opium is usually necessary to relieve the pain; morphin, given hypodermically, gives the best results in adults and Dover's powder and paregoric in children. Bromids are valuable adjuvants, and in young children may take the place of the opiate. Chloral may be used, but with caution in children and the aged. Mercury is recommended by many authorities as an internal antiseptic to combat the septic process. Calomel or corrosive sublimate given in small, frequently repeated doses, are recommended for this purpose. Iodid of potassium is of value during the subsidence of the symptoms to hasten absorption of the exudate. Convalescence being slow, this stage requires, in addition to a generous diet, cod-liver oil, iron, arsenic and strychnin as general tonics. It is advisable to continue the iodid until absorption of the inflammatory exudate is as complete as possible.

CHANCROID; SOFT CHANCRE.

DEFINITION.—A venereal sore developed upon the genitals as the result of contagion. It is productive of no constitutional disease.

ETIOLOGY.—Undoubtedly due to a specific microörganism. The sore is contracted during sexual congress from contact with a purulent discharge. It is most likely to attack individuals who are not particular about personal cleanliness.

SYMPTOMS.—After a period of incubation varying from one to ten days and usually less than three days the first evidences of the chancroidal sore appears upon the genitals as a small papule. In the course of two or three days it becomes a pustule; this soon breaks and forms an ulcer. The ulcerating sore is distinctly circular in outline, has sharply cut and perhaps undermined edges, and is surrounded by a reddened and inflamed area. The mucous membrane is usually ulcerated entirely through and the floor of the ulcer is covered with a yellowish or greenish slough. The discharge is at first thin, but soon becomes a characteristic yellow pus.

Chancroids in distinction from chancres are always soft and supple unless they have been cauterized; they are usually multiple since the secretion readily infects surrounding tissues. If

for any reason, as from phimosis or on account of a protective crust, the secretion is retained, the ulceration may become phagedenic and very destructive. Chancroid causes considerable pain, tenderness and discomfort.

Associated with a large number of these cases is an involvement of the inguinal glands, causing suppurating buboes (which see) of a severe type.

DIAGNOSIS.—Herpes preputialis may be mistaken for chancroid after the rupture of the vesicle, but the course of the affection will soon settle the diagnosis in most cases. It is of the greatest importance to determine the difference between it and true chancre. It should be kept in mind, however, that a mixed infection is possible.

CHANCROID.	CHANCRE.
Incubation one to ten days; average two to three.	Incubation ten to thirty days; average twenty-one.
Usually multiple; rarely single.	Usually single.
Situated on genitals or anogenital region.	Most common on genitals, but often found on lips, and may attack any portion of the body.
Round or oval; punched out edges; depressed, pus-covered floor; base soft; bright red areola; abundant secretion of pus, often hemorrhagic and foul.	Irregular edges ill-defined; ulcer shallow and smooth; base hard, parchment like and movable; color slight dull red, unless inflamed; little secretion.
In favorable cases recovery six to eight weeks, leaving scar; phagedena common if neglected.	Recovery in six weeks, or may persist for months; seldom leaves a scar; phagedena rare.
Buboes are not constant; large; inflamed; more likely to suppurate.	Buboes constant; moderate in size, seldom inflamed; seldom suppurate.
Treatment entirely local.	Treatment local, but it is influenced by systemic treatment.

TREATMENT.—The utmost attention to personal cleanliness is required in the treatment of the soft chancre on account of the virulent discharge which causes infection of adjacent parts and when it is retained, phagedena. In unmixed cases mercury or other internal remedies are absolutely useless. Let the patient

be kept as quiet as possible and avoid local irritation or friction to the sore. Scabs or crust, if present, should be removed and the part kept free from secretion by frequent washing with a bland soap and water. After washing the organ should be carefully rinsed and immersed in water as hot as can be borne. Hot solutions of boric acid, carbolic acid (1 to 50) and corrosive sublimate (1 to 2000) may be used for this purpose, and when more convenient they may be applied upon sterile gauze compresses. To remove the last vestige of discharge from the ulcer peroxid of hydrogen may be applied. Hyde recommends a spray of iodized phenol, as in the following:

Carbolic acid	dr. 1
Tinct. iodin	dr. ½
Glycerin	dr. 2
Alcohol	dr. 2
Water enough to make	oz. 1

For external use only, in spray, diluted with water to 10 per cent of this strength.

After thorough cleansing of the sore it should be carefully dried and a dusting powder applied night and morning. Iodoform is in many respects the most valuable drug for this purpose. It promotes rapid granulation and is slightly anesthetic, but its odor is objectionable. The following formula is suggested by F. P. Mitchell:

Iodoform	gr. 10
Hydrastin	gr. 6
Tannic acid	gr. 6
Lycopodium	dr. 1

Nosophen, europhen, aristol, and various other preparations are useful. A mixture of acetanilid and boric acid makes a good dusting powder. Calomel is a popular local application, either alone or mixed with an equal amount of subnitrate of bismuth. Orthoform may be combined with these powders to relieve the pain or tenderness.

Some prefer wet dressings, containing antiseptic, astringent, sedative and sometimes stimulating applications. These include black and yellow wash, alcoholic lotions, the opiates, cocain and the astringent salts of copper and zinc. They are applied on

strips of lint or gauze. A representative of this class is the following, recommended by J. W. White:

Boric acid	dr. 1
Zinc sulphate	dr. 1
Tinct. opium	oz. 2
Rosewater	oz. 4

For external use only.

If in spite of local treatment the chancroid spreads rapidly, cauterization is necessary. A single application of the acid nitrate of mercury is usually sufficient. Other caustics are nitric and carbolic acids, nitrate of silver, caustic potash, sulphate of copper and the actual or the galvano-cautery. Severe measures like these are seldom necessary. The surgical treatment of a chancroid by dissecting it out and removal is now seldom advocated. Continuous immersion of the ulcer for hours at a time in water as hot as can be borne is of the utmost value in rapidly destructive chancroids. If necessary to cover the sore with the hot water the patient can employ the sitz-bath for this purpose, leaving it only to empty the bowels and bladder.

Cases complicated by phimosis sometimes require circumcision.

CHICKENPOX—*See* Varicella.

CHILBLAINS; FROSTBITE.

Definition.—A local inflammation of the skin caused by exposure to cold. Frostbite directly follows exposure; chilblain is a subacute condition, appearing upon chilling the surface and tending to persist.

Etiology and Pathology.—The underlying causes of chilblain are a sluggish circulation and a poorly nourished body. It has been suggested that in patients subject to this disease the coagulability of the blood is reduced, facilitating an exudate of lymph at the affected point. Chilblains are excited by exposure to the cold. The toes and feet are most commonly affected, but the hands and other portions of the body frequently suffer.

Symptoms.—There is a troublesome sense of heat and itching and the part becomes swollen, dark red and at times almost purple in color. In the most severe cases blisters and sometimes ulcers form.

Treatment.—Chilblains may be prevented by avoiding sud

den or severe changes of temperature. Instruct your patients to wear woolen next to the skin, to take plenty of outdoor exercise in order to keep the circulation active, to bathe the feet frequently in tepid or slightly cool water and dry them with friction, and to see that the shoes are not too tight, especially around the ankles. Nutritive diet and attention to proper alimentation are important. Tonic and alterative medication assists in improving the circulation; cod-liver oil, iron, arsenic, quinin and the iodids are all of value. Brocq used a pill containing the following, with good results:

Quinin	gr.	¾—3
Ergotin	gr.	¾—3
Powdered digitalis	gr.	¼—⅓
Extract of belladonna	gr.	½

Calcium chlorid has been recommended to increase the coagulability of the blood and thus check the exudation of lymph into the tissues. It may be given for this purpose in doses of 10 to 20 grains, three times a day, but is of questionable efficacy.

After exposure to cold and chilling of the skin the part should be warmed gradually, preferably by friction. Rubbing with snow, cold compresses or bathing in cold water help to restore the circulation to frostbitten members. Under no circumstances should the patient "thaw out" before a warm stove. Warm drinks may be administered and, if the sensation of cold is severe, a mild stimulant may be taken, as half a dram of aromatic spirits of ammonia in water or a little brandy or whiskey.

A great variety of local remedies have been recommended for chilblains. These include counter-irritants to stimulate circulation, astringents to constrict the dilated vessels and raise the blood pressure and anti-pruritics to relieve the most disagreeable symptom—the itching and burning.

Solutions of bicarbonate of soda, borax, alum, subacetate of lead or carbolic acid; alcohol, spirits of camphor or turpentine; decoctions of eucalyptus, oak-bark or walnut leaves; tincture of iodin, solutions of nitrate of silver and many other drugs are used for this purpose.

Before using any of these preparations it is a good plan to bathe the feet in very warm water and dry them carefully and thoroughly. The lotion or ointment which is found to do the

most good may then be applied and may be preceded with an alcohol rub with advantage in many cases. The best time to use these preparations is night and morning, but in very severe cases several applications daily may be required.

Following are a variety of formulas, some of which should be found useful in ordinary cases:

Zinc acetate ..... dr. 1
Water ..... pt. 1
Bathe the feet in this lotion night and morning.

Carbolic acid ..... gtt. 10
Camphor ..... dr. 1
Zinc ointment, enough to make ..... oz. 1
Ointment to be applied night and morning.

Menthol ..... gr. 10
Tannic acid ..... dr. ½
Zinc oxid ..... dr. 1
Lanolin ..... dr. 2
Petrolatum, enough to make ..... oz. 1
Use as an ointment.

Camphor ..... gr. 120
Solution of lead acetate ..... dr. 2
Oil of turpentine ..... dr. 1
Use as an ointment.

Resorcin ..... oz. 1
Ichthyol ..... oz. 1
Tannic acid ..... oz. 1
Water ..... oz. 5
Paint the affected part every night.

Creosote ..... gtt. 12
Goulard's extract ..... gtt. 12
Extract of opium ..... gr. 1½
Pine tar ..... gr. 90
Lard ..... av. oz. 1
Apply at bedtime.

Oil of eucalyptus ..... dr. 2
Carbolic acid ..... gr. 110
Camphor ..... dr. 1
Yellow wax ..... av. oz. ½
Petrolatum ..... av. oz. 3
Ichthyol ..... gr. 20-100
Resorcin ..... gr. 20-40
Lanolin ..... oz. 1
Olive oil ..... dr. 3
Water ..... oz. 2

Rub in at night after bathing in hot water and rubbing with alcohol.

Spirits of camphor	dr. 2
Carbolic acid	gr. 40
Alcohol	oz. ½
Listerine	oz. ½
Water, enough to make	oz. 2

To be used as a lotion.

Tincture cantharides	dr. 3
Soap liniment	dr. 9

Wardrop's liniment.

Bartholow recommends:

Acid carbolic	dr. 1
Tincture iodin	dr. 2
Tannic acid	dr. 2
Simple cerate	oz. 4

Ointment.

Sometimes very stimulating applications are required, as nitrate of silver solution (50 per cent) or pure tincture of iodin.

Bartholow recommends:

Sulphurous acid	dr. 3
Glycerin	dr. 1
Water	dr. 1

Apply to affected part.

If the surface becomes ulcerated, remove all superfluous tissue and dress antiseptically. Bland ointments, as vaselin and zinc oxid ointment, make good protectives. Granulation is encouraged by touching with the solid stick of nitrate of silver.

CHOLELITHIASIS.

DEFINITION.—A condition due to the precipitation of the solid elements of the bile, resulting in the formation of calculi or concretions, which act as obstructions in the biliary passages.

CHARACTER.—These calculi are made up of cholesterin and bilirubin-calcium either separately or combined in varying proportions, the cholesterin, however, usually predominating. They vary in size from a grain of sand to that of a walnut, and may be single or multiple.

ETIOLOGY.—Cholelithiasis may occur at any age, but is usually a disease of adult life. Four-fifths of the cases occur in women and 90 per cent of these have borne children. Tight lacing has

been mentioned as a favoring cause, because it obstructs the flow of the bile. These patients are usually stout, lead sedentary lives and are good livers. Constipation, cardiac disease and diabetes are regarded as favoring conditions. It is now believed that in many cases bacteria are the exciting cause. These migrate into the bile passages from the intestine and act as nuclei for the formation of concretions. Other foreign substances, cellular debris, etc., may act in the same way.

SYMPTOMS.—The symptoms produced by gall-stones are: 1. Those produced by their passage through the ducts—biliary or hepatic colic. 2. Those produced by obstruction. 3. Those due to ulceration and perforation at any portion of the biliary tract. On the other hand, in many cases gall-stones exist for years without producing any symptoms.

Biliary or Hepatic Colic.—An attack of biliary colic commences suddenly with severe pain, sometimes preceded by gastric distress but often without premonitory symptoms. This pain is felt over the region of the gall bladder, radiating up the right side of the thorax to the shoulder and across the abdomen. It is paroxysmal in character, intense and agonizing. The patient finds it impossible to keep still, and usually loses all self-control, throwing herself from side to side on the bed or floor. Vomiting occurs from time to time and gives momentary relief. In severe cases it is sometimes persistent. Perspiration is profuse; the circulation is depressed, the pulse becoming slow and hard and the extremities cold. Not infrequently there is considerable rise in temperature (101°-104° F.). Jaundice more or less marked is present in nearly every case, following the attack. The pain disappears upon the passage of the stone. This may occur in a few hours or require days or even weeks, the stone then forming a chronic obstruction. The presence of a dilated gall-bladder may often be detected upon local examination. There is usually well marked tenderness in the hepatic region.

Obstruction.—A stone may cause symptoms of obstruction by lodging either in the cystic duct or the common duct. In the first case, dilatation or dropsy of the gall-bladder is likely to ensue. This forms a well-marked tumor which may be felt below the margin of the liver, projecting directly downwards into the

abdomen. Sometimes this tumor becomes enormous in size, even simulating an ovarian cyst. Its contents become thin and less bile-like as it increases in size; in advanced cases it becomes perfectly clear. Acute inflammation, empyema, calcification and atrophy are complications. It should be remembered that in obstruction of the cystic duct jaundice is not necessarily present.

If the obstruction is in the common duct it usually occurs at its mouth; hence there is greater likelihood of infection and dilatation of the common duct. Catarrhal cholangitis with obstruction, according to Osler, is marked by the following group of symptoms: (a) intermittent paroxysms of chills, fever and sweating, simulating ague; (b) persistent jaundice, more intense after paroxysms; (c) hepatic pain and gastric disturbance.

In other cases infection results in suppurative inflammation of the common duct, which may extend to and invade the gall-bladder and liver and even produce hepatic abscess. In this form the fever is more likely to be remittent, with evidences of septicemia.

Ulceration and Perforation.—Perforation may cause fistulous connection between the gall-bladder and the hepatic duct, the portal vein or the liver; between the bile passages and the intestine, or, rarely, the stomach, urinary passages or lungs. Perforation into the abdominal cavity is not uncommon. Sometimes gall-stones are the cause of obstruction of the bowels. These conditions produce symptoms analagous to those resulting from obstruction or perforation from other causes. A closed fistulous tract may be attended with no symptoms, and is impossible of diagnosis.

Prognosis.—Gall-stones may be present and produce no symptoms. Biliary colic is seldom dangerous to life, although perforation occasionally occurs. A surgical operation is often necessary for cure.

Diagnosis.—Biliary colic may be confused with intercostal neuralgia, pleurisy, gastralgia, intestinal colic, renal colic, gastric ulcer, acute appendicitis, etc. A careful physical examination usually establishes the diagnosis without difficulty. In most cases the recurrence of the attacks, association with jaundice and the discovery of calculi in the feces leave no doubt as to the character of the disease.

TREATMENT.—Since biliary colic is prone to occur in obese patients past middle life, it is well to prescribe systematic exercise suited to the strength of the patient and a regulated diet that excludes saccharine and starchy articles of food. Phosphate or sulphate of sodium may be used to keep the bowels regular and the alkaline mineral waters taken freely in order to flush the excretory tracts. In default of this an abundance of pure water is useful.

No medicinal treatment offers hope of dissolving the calculi when they are once formed. Any good results obtained by remedies which aim at this end are doubtless due to facilitating the passage of the stone. Large doses of olive oil (a wineglassful at night) are believed to have a beneficial effect. Sulphuric ether and chloroform have been recommended. Durande prescribed with good results a mixture made up of three parts of sulphuric ether and two parts of oil of turpentine. Twenty drops to a dram is given every morning. This is likely to prove irritating to the stomach, but is regarded as peculiarly efficacious in France. Sodium salicylate seems to exert a salutary effect in some cases. It stimulates the flow of bile and may reduce the jaundice. Cholate of sodium has also been recommended. But probably the salines and the alkaline mineral waters are as useful as anything.

For the relief of an attack of biliary colic it is necessary to resort to hypodermics of morphin and atropin. Hot applications or, better, the full hot bath, may be used. This causes muscular relaxation, relieves the pain and spasm and thereby favors the passage of the stone.

When the attacks occur with persistent regularity or there is evidence of obstruction or other complications surgical intervention should be advised.

CHOLERA: ASIATIC CHOLERA.

DEFINITION.—An acute contagious disease, usually occurring in epidemics and characterized by violent purging and great bodily depression.

ETIOLOGY.—Cholera is caused by a specific bacterium, the comma bacillus discovered by Koch in 1884. It is a short, thick

organism, usually curved (resembling a comma, or the letter S) and exceedingly motile. The germs gain entrance to the alimentary tract, where alone their presence causes the disease, mainly by drinking-water, milk, uncooked vegetables, fruits and other articles of food which have become contaminated by the dejecta of patients suffering from the disease. The vomitus rarely contains the germs. Soiled clothing, uncleanliness of the person, or flies may serve for the transmission of infection. The cholera spirilla require an alkaline medium for growth, are destroyed by the normal acid gastric juice, but multiply rapidly in the intestine. The disease is most likely to occur in individuals whose bodily resistance is undermined by disease, worry or fright, or whose digestive organs are permanently or temporarily deranged.

Filth, defective personal hygiene and poor sanitary surroundings favor the development of cholera. In temperate climates it occurs only during the warm months of summer or in early autumn. It is endemic in the hot, moist climate of India throughout the year and its occasional visitations to Europe and the United States are due to importation from that country, either directly or by means of infected merchandise. An attack of cholera confers no immunity against subsequent contraction of the disease.

PATHOLOGY.—The body of a person who has died from cholera is greatly emaciated, the features drawn and sharp, the eyes sunken and the skin anemic. There is frequently a post-mortem rise of temperature of several degrees. Rigor mortis comes on early and there are contractions of the muscles which draw the limbs into unusual positions. The tissues are found to be dry and the blood remaining in the vessels is dark and thick on account of the enormous quantity of fluid withdrawn during the course of the disease. The spleen is not enlarged, though there may be evidences of cellular degeneration. The liver and kidneys, on the other hand, are swollen and hyperemic; there is cloudy swelling of their cells, with commencing fatty degeneration and epithelial denudation of the cystic mucosa of the liver and of the tubular structure of the kidney. The heart is dry and anemic and the lung may become the seat of congestion.

But the essential changes are in the alimentary canal, prin-

cipally in the intestines. In the early stages of the disease there is a catarrhal condition of the mucous lining, with capillary injection and some swelling and edema, and the bowel is found to contain a serous fluid, the "rice-water" of the disease. The epithelium is found more or less denuded. In more severe cases hemorrhagic patches are found, the agminated and Peyer's glands are inflamed and perhaps ulcerated and blood is found mixed with the contents of the bowel, ranging in quantity and thickness according to the stage and severity of the disease. Sometimes (especially if the patient died during the reaction) the mucous membrane will be found covered with patches of false membrane. The changes that take place in the stomach are practically the same, but somewhat less severe.

SYMPTOMS.—The period of incubation in cholera varies from a few hours to five days. The attack may commence suddenly, but in many cases (one-third to two-thirds) is preceded by a stage of *premonitory diarrhea* lasting from a few hours to two or three days. It commences like an ordinary diarrhea, the patient passing copious, frothy, fecal stools which finally become semi-fluid or fluid. There is no fever; there may be slight nausea or colicky pains, but otherwise the patient feels fairly well and may go about his work, spreading the disease, since the dejecta during this stage contain the cholera spirilla. If the diarrhea continues for several days the patient feels a sense of weakness, with chilliness, vertigo, slight muscular cramps and mental depression. Cases of this kind may develop no farther, in which case they constitute the so-called *cholerine*.

The Stage of Serous Diarrhea may follow the premonitory stage or commence suddenly. The earliest and most prominent symptom of this stage is the diarrhea. The dejections change to a serous, colorless, odorless fluid containing particles of denuded epithelium, the characteristic "rice-water" stool. This fluid is slightly alkaline in reaction, contains numerous cholera bacilli, albumin, sodium chlorid and other salts derived from the blood; it has a specific gravity of 1005-1010. Frequently it is stained with blood, especially late in the disease. The number of passages is very great and the quantity passed is enormous, rapidly draining the body of its fluids. Associated with the diarrhea is frequent and copious vomiting of serous fluid of

a similar character. The tongue becomes dry, parched and thickly coated and there is a sense of discomfort and burning in the stomach. The thirst is excessive. A most distressing but characteristic symptom is the appearance of muscular cramps, usually of the feet, calves and legs, sometimes, however, attacking the upper extremities.

The withdrawal of fluid causes a rapid loss of flesh. In a few hours the change in the appearance of the patient is startling. He becomes greatly emaciated, the abdomen depressed and boat-shape, the cheeks hollow, the features sharpened, the eyes sunk deep in their sockets. The secretions are nearly dried up; the eyes, no longer moistened by tears, are easily irritated and become red and bloodshot; the urine is diminished in quantity or entirely suppressed and may contain albumin or sugar; the skin alone may be moist with a cold sweat. The surface and extremities are cold, but the patient complains of internal heat, and the rectal temperature shows an elevation of two or three degrees. The pulse becomes rapid and weak and the respiration shallow.

In the *foudroyant* type of the disease the patient usually lives but a few hours and sometimes dies almost instantly. *Cholera sicca* is of this character, vomiting and diarrhea being absent. After death the bowels are found to be filled with serum.

Algid Stage, or Stage of Collapse.—After two to sixteen hours of the serous stage improvement may follow or the patient pass into the algid stage. The same symptoms still persist, but the diarrhea, from the exhaustion of fluid, becomes a constant dribbling and the muscles of the legs, arms and abdomen continue in a condition of tonic spasm with flexion of the smaller joints. The surface of the body becomes deathly cold and cyanotic. The heart is overburdened in its effort to force the thickened blood through the arteries and capillaries. The pulse becomes more and more feeble and finally disappears at the wrist; the heart sounds are feeble. Breathing is shallow and difficult and the patient may suddenly expire if he attempts to sit up. The mind, which has previously been bright, becomes dull and apathetic and the patient may become unconscious and gradually pass into a condition of coma, closely simulating death. This stage lasts from a few hours to several days, and usually terminates fatally.

Stage of Reaction.—This may follow any of the preceding stages. There is immediate improvement in all the symptoms, and in a favorable case in a week or ten days the patient has regained his usual health except for a certain degree of asthenia and probable diarrhea. There are, however, various *complications* which may delay or prevent recovery. Among these are dyspepsia, diarrhea, nervous or mental ailments, bronchitis, pneumonia, erysipelas and sepsis. One of the most troublesome, occurring during convalescence, is cholera-typhoid. Acute nephritis is a dangerous and often fatal complication of this stage.

DIAGNOSIS.—In the course of an epidemic the diagnosis of a typical case is usually easy. The disease with which it is most commonly confused is cholera morbus. Similar symptoms are produced by ptomains and by toxic doses of metallic substances, especially arsenic. The following table is submitted:

ASIATIC CHOLERA.	CHOLERA MORBUS.	PTOMAIN POISONING.	METALLIC POISONING.
Occurs in epidemic; caused by food infected with comma bacillus.	Caused by improper food, fruits and vegetables.	Caused by decomposing animal food.	Caused by poisonous dose of metallic poison (usually arsenic).
Onset often gradual with premonitory stage.	Onset sudden, usually in night or early morning.	Commences 2 to 24 hours after ingestion of food.	Onset within half an hour or an hour after taking the poison.
Diarrhea usually precedes vomiting.	Vomiting and diarrhea coexist	Vomiting and diarrhea coexist.	Vomiting precedes diarrhea.
Bitter taste; no blood in vomitus.	Sour or bitter taste; no blood in vomitus.	Bitter taste; mucus but no blood in vomitus.	Metallic taste in mouth; vomitus streaked with blood.
"Rice-water" discharges; may contain blood late in disease.	Bilious discharges; often greenish; no blood.	Watery discharges; sometimes constipation.	Watery discharges; often stained with blood.
Colicky pains slight; cramps in limbs very severe.	Diarrhea associated with severe colicky pains; cramps if present much less severe.	Intense abdominal pains; cramps in calves of legs.	Great heat and burning in stomach; pain paroxysmal; cramps later symptom; abdominal tenderness.

Asiatic Cholera.	Cholera Morbus.	Ptomain Poisoning.	Metallic Poisoning.
Emaciation great; rapid and continuous loss of strength.	No marked emaciation; physical depression temporary; rapid recovery when bowels empty.	Emaciation not marked; considerable loss of strength; rapid recovery when bowels emptied.	Emaciation not great; symptoms not improved by diarrhea.

Prognosis.—The disease is a very fatal one, the mortality ranging from 20 to 80 per cent in different epidemics. In Hamburg in 1892 the death rate was 42 per cent. Most of the deaths occur during the algid stage or from complications arising during the period of reaction.

Treatment.—*Prophylaxis.*—An efficient quarantine system should prevent the disease gaining a foothold in an unaffected country. During the course of an epidemic persons likely to be exposed should use special care concerning diet. Fresh fruits and vegetables and all other articles of food which are likely to produce diarrhea should be avoided. Water and milk should be boiled, and food, when possible, freshly cooked and protected from contamination by flies or dirt. An unclean dishcloth has caused an epidemic on ship-board. The person and his surroundings should be as cleanly as possible. Any digestive derangement should be promptly attended to and the slightest diarrhea should be checked by opiates, astringents and intestinal antiseptics, as in the following:

Deod. tinct. opium	dr. 5
Fl. ext. hematoxylon	dr. 5
Arom. sulphuric acid	dr. 5
Syrup ginger, enough to make	oz. 4

As the cholera bacillus thrives only in an alkaline medium, and is destroyed by acids, the frequent daily use of a citric, tartaric or a weak sulphuric or hydrochloric acid lemonade is a rational means of prophylaxis. The personal habits should, of course, be temperate and devoid of excesses of any kind.

In the sick-room the attendants should employ the most scrupulous cleanliness. The discharges are to be disinfected by contact for an hour in a closed vessel with carbolic acid solution (5 per cent), formalin solution (5 per cent), mercuric chlorid

(1:2000) or fresh solution of chlorinated lime. They should then be mixed with sawdust and burned or buried with quicklime. Articles of food unused by the patient should be destroyed, his dishes disinfected and his bed-clothing and linen boiled. Mattresses and heavy clothing are best burned. The attendants should avoid unnecessary contact with the patient and should wash the hands after such contact, and always before eating. Haffkine has used an antitoxin in India for the prevention of the disease with good results.

Treatment of the Attack.—During the initial diarrhea the patient should be promptly put to bed, all food withdrawn and opium and astringents administered. The deodorized tincture of opium (20 drops), Dover's powder (5 grains), a pill of opium and acetate of lead (1 grain each), or the opium and sulphuric acid mixture just described may be given by the mouth. If there is vomiting, give a hypodermic of morphin ($^1/_4$ to $^1/_3$ grain). The acid drinks recommended for prophylaxis will allay the thirst. Sulphuric acid is not only bactericidal to the cholera bacillus, but is astringent and harmless. Cantani recommends intestinal irrigation with the following:

Tannic acid	dr.	2-5
Laudanum	gtt.	20-30
Gum arabic	dr.	5-12
Water or infusion of chamomile	qt.	2

This should be introduced at a temperature of 105° to 110° F. It neutralizes the alkalinity of the intestinal contents, antidotes the toxins and is astringent. Clinicians generally agree that it is a most valuable therapeutic procedure. A little good brandy or strong coffee may be useful during this stage.

During the stage of serous diarrhea it is generally useless to administer medicines by the mouth, since they are usually promptly rejected. The deodorized tincture of opium, chlorodyne (mistura chloroformi, N. F.), camphor and similar drugs are sometimes given to check diarrhea and relieve pain and cramps, but hypodermics of morphin ($^1/_4$ to $^1/_2$ grain) usually are better. The formula of the Mistura Chloroformi N. F. is as follows:

Chloroform	Cc.	12.50
Tincture Indian cannibis	Cc.	12.50
Glycerin	Cc.	12.50
Ether	Cc.	3.50
Tincture capsicum	Cc.	6.50
Water	Cc.	6.50
Oil peppermint	Cc.	0.20
Morphin sulphate	Gm.	0.25
Alcohol enough to make	Cc.	100.00

15 to 60 minims as a dose.

Popular remedies of this class are Squibb's and "Sun" cholera mixtures. (See Cholera Morbus.)

Salol, salophen, salicylate of bismuth and other intestinal antiseptics have been recommended. Stimulants, as iced brandy and champagne, are agreeable. The vomiting is ameliorated by small pieces of ice, and the cramps relieved by vigorous friction with compound mustard liniment, dry mustard or any other good counter-irritant. Turpentine stupes or a mustard poultice may be applied to the abdomen.

The main aim of treatment should be to restore fluids to the body. For this purpose Cantani's tannic-acid injections are useful, while they are also antitoxic and astringent. More effective in this stage is the introduction of hot salt solution into the body by hypodermoclysis. For practical purposes the normal salt solution (0.6 per cent of sodium chlorid), or a teaspoonful of salt in a quart of hot water, answers the purpose, but Cantani uses the following:

Sodium chlorid	dr.	1
Sodium carbonate	gr.	45
Distilled water	qt.	1

Of this solution one or two quarts are slowly injected into the subcutaneous tissues of the buttocks, flanks or back. The fluid is introduced through an aseptic aspirating needle from a fountain syringe. Its temperature should be 105°-110° F. If stimulants are needed they may be added to this injection fluid. This method of treatment produces excellent results, the improvement in symptoms within a few minutes after injection sometimes being remarkable. It may be repeated every three or four hours.

During the algid stage the introduction of fluid by hypoder-

moclysis or enteroclysis, as already described, should be persisted in. An effort should be made to restore the surface heat by friction, sinapisms, dry hot packs or the full warm bath. Stimulants are required and whisky, brandy, aromatic spirit of ammonia, compound spirit of ether, and digitalis may be given internally or, better, strychnin, camphorated oil, or sulphuric ether by hypodermic injection.

The treatment of the *stage of reaction* is addressed mainly to complications that may arise. Not till the patient has reached this stage may food be permitted, and even then, at first, fluid food only, given with the greatest circumspection, since diarrhea and relapses may occur. Liquid peptonoids, iced milk and meat broths are first allowed. Thé treatment is in the main tonic and supportive. Strychnin, quinin and hydrochloric acid are likely to prove useful. Special attention should be given to the digestive organs and the restoration of the urinary function.

CHOLERA INFANTUM.

DEFINITION.—An acute, toxic disease of young children, characterized by profuse diarrhea, high fever, rapid pulse and great prostration. The term is often incorrectly applied to the common infantile summer diarrhea. Cholera infantum is fortunately now very rare.

ETIOLOGY.—Cholera infantum is distinctively a summer disease. The heated season not only undermines the resisting power of young infants but also favors the multiplication of bacteria and the production of ptomains in their food. Cholera infantum is always a milk toxemia. It should be made plain to every mother that *the use of tainted milk and decomposing milk foods is the only cause of the disease.* It practically never occurs in breast-fed babies or in children more than two years of age.

PATHOLOGY.—The morbid changes found after death are not very marked. There is an acute desquamative catarrh of the mucous membrane of the stomach and bowels, more marked in the latter, with some swelling, and possibly ulceration of the glands. There may be some cloudy swelling of the cells of the liver. The symptoms are evidently produced by the profoundly depressing effect of the toxin upon the central nervous system.

Paresis of the intestinal walls is the result, with free escape of fluid into the bowels. No single causative microorganism has been found as yet.

SYMPTOMS.—The symptoms of cholera infantum are in many respects similar to those of Asiatic cholera. The disease usually commences suddenly with vomiting, purging and high fever in a child previously well or who has had a slight diarrhea for a few days. The vomited matter consists at first of the contents of the stomach, then of mucus and bile and finally becomes serous. The discharges from the bowels, which are at first fecal, soon become watery, alkaline, greenish in color and have a stale, musty odor. They are very frequent and profuse, soaking through the diapers and bed clothing, leaving hardly a trace of fecal matter. The urine is decreased in quantity and may be entirely suppressed.

The temperature taken by the rectum is elevated, usually running from 102° to 105° F., though it may reach 107° or 108° F., notwithstanding that the skin and extremities are cold and clammy. The pulse is very rapid (140 to 160) and weak.

Thirst is extreme, but the irritability of the stomach causes liquids, medicines and foods to be rejected as soon as they are taken. At first the baby is restless and cries from the colicky pain in the bowels, but soon it only moans. The strength is rapidly lost and with the constant withdrawal of fluids the child loses in weight; in a few hours the features become aged and drawn, the eyes sunken, the abdomen hollowed and the body emaciated. The child often passes from this condition into a half-unconscious state, from which it never recovers. There may follow the condition known as pseudo-hydrocephalus, with contractures, subsultus, convulsions and retraction of the neck.

In cases which end in recovery the vomiting ceases, the stools change in color, become more fecal and less frequent, the temperature falls, the child becomes less restless and general improvement follows. Convalescence is slow, and there is a tendency to relapses.

DIAGNOSIS.—In a genuine case of cholera infantum there can be no question as to the diagnosis.

PROGNOSIS.—An extremely dangerous disease, the mortality in bottle-fed babies under six months being perhaps 90 per cent. It often ends fatally within thirty-six hours. After three days

[illegible] The prognosis is most [illegible] I often leaves [illegible] remit and incline to [illegible]

[illegible] is usually a [illegible] are an erroneous [illegible] [illegible] bowl during [illegible] appendix—In- [illegible] attack of vomiting and [illegible] given for a day or two, the [illegible] except a little barley [illegible] instruments, with [illegible] may prevent a subse- [illegible]

[illegible] the beginning of an attack of [illegible] including cream-milk, should be [illegible] in the earlier administration of food [illegible] based. Then it should be [illegible] commencing with liquid peptonoids, with or [illegible] lightly and meat juices. Milk [illegible] until the [illegible] of the stomach is [illegible] The [illegible] thirst give [illegible] are necessary, give iced brandy or [illegible] are useful, they are agreeable to the [illegible] [illegible] A weak solution of hydrochloric [illegible] with a little lemon juice and slightly sweetened [illegible]

If [illegible] early, while the discharges are still fecal, [illegible] to commence with several small doses of calomel. These cleanse the intestinal tract and are sedative to the stomach. The following is satisfactory:

Calomel	gr. 1
Opium	gr. 1
Milk sugar	gr. 12

Make into twelve powders. One every half hour for three or four doses, then every hour or two hours for as many more doses.

Podophyllin in small doses ($^1/_{20}$ grain) may be given in the

same way. But in most cases the incessant vomiting makes every attempt at drug treatment worse than useless. It is, however, important that the intestinal tract should be thoroughly cleansed. This is most effectively done by gastric and intestinal lavage. The stomach may be washed out with an ordinary soft-rubber catheter to which a funnel has been attached by rubber tubing. The water used should have a temperature of 99° to 100° F. and should be allowed to flow in and out of the stomach until it returns clean. Various solutions are used for this purpose, among them sodium bicarbonate (½ dram to the pint), sodium chlorid (1 dram to the pint), a weak solution of boric acid (½ dram to the pint) or the following:

Sodium chlorid	Gm.	4
Sodium carbonate	Gm.	3
Distilled water	Cc.	1000

The physiological and normal salt solutions are specially indicated in the later stages, both by stomach and intestine. Hydrochloric acid in weak solution may also be used to wash out the stomach, as:

Hydrochloric acid	Cc.	1
Distilled water	Cc.	200

Stomach lavage is entirely harmless; it rarely provokes vomiting—indeed, in many cases a single thorough washing will check further vomiting.

Following this the colon should be washed out. For this the normal salt solution (1 dram to the pint) is probably the most valuable, all things considered. It removes the bacteria, their toxins, and the accumulated debris that seems to act as a culture medium, and at the same time some of the solution is absorbed and replaces some of the fluid lost. The rectal tube is carried well up into the colon; it is introduced slowly, the fluid being allowed to run so as to balloon out the gut ahead of it and facilitate its passage upward. The child is placed on the left side and the hips well elevated. Besides the salt solution the following are recommended: hydrochloric acid (1:200), resorcin (1:1000), tannic acid (1:100). The tannic-acid solution recommended by Cantani for cholera (which see), properly diluted to suit the child's age, would doubtless be valuable. Enemata

of ice-water have been recommended for use when the temperature is high.

The number of medicines which can be used to advantage in the average case of cholera infantum is small. Brandy and champagne as stimulants have already been alluded to. Strychnin is a valuable stimulant and may be given hypodermically in doses of $^1/_{100}$-$^1/_{48}$ of a grain to a child a year old. Morphin is generally considered the most useful remedy for the disease. Holt recommends for an infant of this age $^1/_{100}$ of a grain with $^1/_{800}$ grain of atropin, repeated in an hour if necessary. This is given hypodermically. It relieves shock, equalizes pulse and respiration, checks the vomiting and quiets the child. The morphin should be given during the stage of restlessness—never when stupor or coma is present or imminent. Bailey recommends atropin in large doses ($^1/_{150}$-$^1/_{80}$ grains) two to four times in the twenty-four hours.

If the vomiting is not a particularly disturbing factor quite a variety of remedies may be given by the mouth, but always with caution, since any drug that produces vomiting is likely to do more harm than good. The following is antiseptic and may be tried for the control of nausea, or even vomiting:

Creosote	gtt. 5-6
Peppermint water	Cc. 5
Simple syrup	Cc. 5
Water	Cc. 90

A teaspoonful every two hours.

One of the most useful drugs is bismuth subnitrate. It should be given in large doses, 10-20 grains every two or three hours. Opium, potassium bromid and astringents are sometimes given by the mouth to meet special indications. Tannalbin is regarded as a valuable and unirritating astringent in diseases of this class. The following is a suggested formula:

Tannalbin	dr. 2
Camphor	gr. 10
Aromatic powder	gr. 20
Sugar	gr. 20

Divide into 24 powders. One every two to four hours for a child one year old.

Local applications have an important place in the treatment of cholera infantum. To reduce the fever some authors recom-

mend the cool bath, when the body temperature exceeds 103° F., commencing with the water at a temperature of 90°-95° F., and reducing it by the addition of ice to 80°-85° F., employing in connection with it vigorous friction of the skin and extremities. In vigorous children this may be effective, but it should be remembered that infants do not react as readily to shock as adults, that the vital forces are profoundly depressed and the internal organs congested, while the surface is cold. In most cases, therefore, the hot pack would seem better, wrapping the child for ten to fifteen minutes at a time in blankets wrung out of hot water; this may be repeated from time to time until the cutaneous circulation is reestablished. The application of a spice poultice or a mild mustard plaster (see Appendix) to the abdomen is often of great value.

In severe cases where the loss of fluid is very great it is sometimes necessary to resort to hypodermoclysis with normal salt solution. About half a pint may be injected at a time subcutaneously, using an aspirating needle and hypodermic syringe.

CHOLERA MORBUS; CHOLERA NOSTRAS.

DEFINITION.—An acute gastro-intestinal toxemia, characterized by colicky pains, vomiting, serous diarrhea and prostration.

ETIOLOGY.—Cholera morbus is most frequent during the hot summer months when foodstuffs spoil quickly and bodily relaxation invites disease. It is essentially a toxemia, due to the absorption of ptomains generated by decomposing food from the gastro-intestinal canal. An attack of cholera morbus usually follows indulgence in unripe or overripe fruits or vegetables or of other articles of diet that have commenced to "change." If the digestive organs are out of order this disease is much more prone to make its appearance. No specific microbe has been found.

PATHOLOGY.—There are no constant pathological changes. Usually there is evidence of a mild acute catarrh of the mucous membrane of the digestive tract. The toxins make their impression mainly upon the central nervous system, causing paralysis and dilatation of the vessel walls and exudation of the watery elements of the blood into the bowels.

SYMPTOMS.—The attack usually commences in the night or the early morning hours with colicky pains in the abdomen, followed by nausea, vomiting and purging. The vomitus at first consists of remnants of food, then of bile-stained mucus, finally of clear serous fluid. The passages from the bowels are also fecal at first, then frothy, thin and greenish in color, and at last consist of very frequent, copious, serous stools, often containing flecks of denuded epithelium—the so-called "rice-water" discharges. The pain is often very severe, at first colicky, then consisting of agonizing cramps in the abdomen. Less frequently there are cramps in the muscles of the legs. The pulse becomes rapid and feeble and the temperature elevated one or two degrees. The skin and extremities are cold to the touch and covered with clammy sweat; the face is pale and cyanotic, the features drawn, the eyes sunken, the intellect dull and apathetic; in fact, the whole picture is one of great physical and mental depression. After a few hours the symptoms usually ameliorate and perfect recovery takes place within a few days.

DIAGNOSIS.—The clinical picture of a severe case of cholera morbus is almost identical with that of Asiatic cholera, and in the course of an epidemic it is practically impossible to differentiate except by examining the stools for the Koch bacillus. There are, however, in most cases certain other differences. (See Cholera.)

Other conditions with which cholera morbus may be confused are acute gastro-enteritis, ptomain poisoning, and the symptoms due to the ingestion of toxic doses of mercury, arsenic or antimony. As to the first two it may be stated that both these and also cholera infantum are essentially of the same nature as cholera morbus. All are food-poisonings and the difference of symptoms is due to the age of the patient, the kind of food or foods taken and the quantity of poison absorbed. The designation ptomain poisoning is more commonly applied to the symptoms produced by animal food and cholera morbus to those caused by vegetable food. But there is no hard and fast dividing line of difference.

PROGNOSIS.—Very few deaths occur from cholera morbus. The very young, the very old and those suffering from severe chronic

diseases quite frequently succumb. The mortality has been placed at three per cent.

TREATMENT.—If called to see a case of cholera morbus early an effort should be made to empty the stomach and bowels of any remaining poisonous substances. The patient should be given a quickly acting cathartic, such as a full dose of castor oil, or Rochelle or Epsom salts. Frequently a bottle of the effervescing solution of citrate of magnesia will be retained when other cathartics would be rejected. To relieve the vomiting and pain the most immediate results are obtained by a hypodermic injection of morphin ($^1/_4$ grain) and atropin ($^1/_{150}$ grain). Chlorodyne or chloranodyne will often relieve the vomiting and diarrhea. Its formula is practically that of the Mistura Chloroformi et Cannabis Indicae comp., N. F.:

Chloroform	Cc.	12.50
Tinct. cannabis Ind	Cc.	12.50
Glycerin	Cc.	12.50
Ether	Cc.	3.50
Tinct. capsicum	Cc.	6.50
Water	Cc.	6.50
Oil peppermint	Cc.	.20
Morphin sulph	Gm.	.25
Alcohol enough to make	Cc.	100.00

Other remedies that may be used when the stomach is not too irritable are Squibb's Cholera Mixture, with the following formula:

Tinct. opium	oz.	1
Spt. camphor	oz.	1
Tinct. capsicum	oz.	1
Chloroform	dr.	3
Alcohol	oz.	5

A teaspoonful in water every two to three hours.

Or "Sun Cholera Mixture," consisting of:

Tinct. opium	oz.	1
Tinct. capsicum	oz.	1
Tinct. rhubarb	oz.	1
Spt. camphor	oz.	1
Spt. peppermint	oz.	1

A teaspoonful in water at proper intervals.

Local treatment greatly modifies the intensity of the pain. A large mustard draft may be placed over the abdomen and allowed

to remain until the skin is thoroughly reddened, or effective counter-irritation may be maintained with hot turpentine stupes. Rubbing the cramping muscles with warm oil or a good liniment relieves the cramps. The following may be tried:

Oil mustard .....dr. 1
Oil turpentine .....oz. 1½
Soap liniment enough to make.....oz. 4

Liniment. Some chloroform may be introduced advantageously.

If there is coldness of the skin and extremities, or a distinct algid stage, hot bottles or sandbags should be placed around the body and limbs, which should be wrapped in hot flannel. Severe cases occasionally require hypodermoclysis or enteroclysis with normal salt solution, and hypodermic injections of strychnin, camphorated oil, digitalis or other cardiac stimulant.

Convalescence should be guarded from indiscretions of diet, since relapses are easily induced. Liquid food for a few days will usually be found advisable. Large doses of bismuth are sedative to the irritated mucous membrane during this stage. If any tendency to diarrhea remains the combination of this drug with an intestinal antiseptic and opium will be useful, as:

Dover's powder .....gr. 24
Benzonaphthol .....dr. 1
Bismuth subnitrate .....dr 2

Make into twelve powders. One every two to four hours for diarrhea.

CHOREA; ST. VITUS DANCE.

DEFINITION.—A neurosis chiefly affecting children and characterized by irregular, spasmodic muscular movements.

ETIOLOGY.—It usually occurs in nervous children of school-age (five to fifteen years). A neurotic parentage is demonstrable in most cases. It is more common in cities than in the country and most frequent in the spring and autumn. Twice as many girls as boys are affected. An attack may be precipitated by slight injuries, worry, fright, anxiety or by imitating the grimaces of other school children. As underlying causes, scarlet fever, whooping cough, measles, eye-strain and other affections have been mentioned, but the prominent factor in its production

undoubtedly is rheumatism. There is a history of this disease in 15 to 20 per cent of all cases. Some authors assert that chorea is always a manifestation of this disease. This, however, must be doubted. It sometimes occurs during the early months of pregnancy and in these cases is likely to be severe.

PATHOLOGY.—The actual pathological changes due primarily to the chorea are slight—usually entirely absent. Sometimes incidental vascular disturbances of the brain are found at the post-mortem. The most important morbid processes associated with the disease are found in the heart; endocarditis is very common. Osler found it in more than half his cases. On the other hand Thompson thinks it less frequent than is generally believed. Occasionally there is pericarditis. Anemia is present in a large percentage of cases.

SYMPTOMS.—An attack of chorea usually commences gradually, with spasmodic twitching of the muscles of the hands or face. This increases in intensity for a week or more until, in a typical case, the child loses all control of the muscles of expression. The eyelids close spasmodically, the facial muscles jerk, the features are momentarily drawn into a grimace and the head thrown to one side; speech is often indistinct and mumbling, and swallowing may be difficult The hands are in constant motion, close spasmodically and objects which are seized are as suddenly dropped. The gait is often stumbling and incoordinate. Usually only one side is affected at first but later the disease may become bilateral. In very severe cases the whole voluntary muscular system is affected and the whole body convulsed by irregular, arhythmical muscular spasms. In the majority of cases the attacks are precipitated or made worse by attempts at voluntary motion, by observation or by anything that directs attention to them. During sleep they entirely disappear. Mental symptoms are quite pronounced. The child usually grows peevish and fretful. Insomnia, disordered sleep and unpleasant dreams are complained of. Intelligence is not usually affected. Early in the disease there may be slight pain in the extremities; later this is absent. The child is usually anemic, the appetite is poor, and there is headache, constipation and loss of weight. A test of the muscles shows distinct loss of muscular power.

An attack of chorea usually lasts from six to twelve weeks

and a second attack may never occur, but there is a tendency for it to recur from year to year, and neglected cases may become constant. *Chorea insaniens* is a very severe variety in which there is delirium and maniacal excitement.

COMPLICATIONS.—A very large percentage of choreic children have heart murmurs. Many of these are undoubtedly anemic, but too often they are due to organic disease. As we have already said, endocarditis is frequently associated with chorea, whether as a result of this condition or as a sequence of rheumatism cannot be positively stated. If there is any rise of temperature endocarditis should be strongly suspected, and in any case a careful examination should be made of the heart. A rapid, irregular pulse or palpitation always requires investigation.

DIAGNOSIS.—There is no great difficulty in the diagnosis of a typical case. In hysterical chorea the movements are more likely to be rhythmical and there is often some rigidity of the affected limbs. Friedreich's disease (hereditary ataxia) may sometimes be mistaken for the disease, but its hereditary nature, the marked and characteristic incoordination increased when the eyes are closed, the nystagmus, the stammering speech and the long, chronic course make errors difficult.

PROGNOSIS.—Chorea is very rarely a fatal disease and patients usually recover completely. In about half of the cases there is but a single attack; very few have more than two or three. The maniacal form, which occurs sometimes in adults, and especially in pregnant women, sometimes causes death, but this outcome is infrequent.

TREATMENT.—It is most important that neurotic children should be spared an undue amount of mental strain. Overstudy, irregular hours and excitement should be avoided as far as possible. The best remedy for an attack of chorea is rest. The child should be taken from school and a careful supervision made of its habits. Violent exercise, severe mental or muscular exertion or excitement of any kind are never to be permitted. If the case is a mild one the patient may be allowed to amuse himself indoors or quietly outside if the surroundings are suitable and the weather fine; severe cases do best in bed, where rest in absolute and perfect seclusion can be secured. If the child requires amusement some one may read to him, avoiding, of course,

exciting literature. If the choreic movements are violent the sides of the bed should be surrounded with pillows or blankets to prevent injury. Members of the family should be instructed to take little notice of the nervous movements and never comment upon them within the hearing of the patient. The rest-treatment alone will often rapidly cure aggravated cases of the disease. A change of climate and environment, such as a visit to the seashore, is often of distinct value.

The diet and the digestive tract require careful attention. These children usually complain of anorexia and often refuse to take sufficient nourishment, although there may be an inordinate appetite for sweets. No special dietetic rules need be laid down except that food should be nourishing, easily digested and taken in sufficient quantity. Milk is the best of foods, while tea, coffee, and highly seasoned or rich foods are certainly distinctly harmful. Laxatives of some kind are usually required, although fruits and vegetables may often be taken in sufficient quantity to make them unnecessary.

Hydrotherapy has a distinct value in the treatment of chorea. A warm daily bath sometimes greatly reduces the severity of the symptoms. In the more violent cases Hare says a quiet night's sleep may often be secured by the hot-pack. The child is closely wrapped in a blanket wrung out of water as hot as can be borne and is then covered with a dry blanket to retain the heat. This usually produces sweating. After drying, the patient is put into a well-warmed bed and carefully covered. Sponging the back, neck and chest with cold water and drying with friction is often beneficial.

The drug par excellence in the treatment of chorea is arsenic. Probably the good results produced are due to its influence upon nutrition rather than to any specific effect, but it is undoubtedly curative in many cases. It is usually given in Fowler's solution (solution of the arsenite of potassium) commencing with three to five drops three times daily and increasing one drop each day until the point of tolerance is reached. This is shown by puffiness about the eyelids, pain in the stomach, nausea, and perhaps vomiting or diarrhea. The dose should then be reduced one-third to one-half and continued. Children of this age are tolerant of arsenic and can usually take from 12 to 15 minims at a dose.

Brower prefers Pearson's solution (solution of the arsenate of sodium) because the sodium salt is less likely to produce gastric irritation—which is important. It is given in the same doses and in the same way as Fowler's solution. Very frequently the arsenical solution may be combined to advantage with various other sedative and tonic drugs, especially when it must be given to persons to whom the administration of a medicine by drop doses cannot be entrusted. The following may be used:

Tinct. belladonna .....dr. 1
Sol. potassium arsenite.....dr. 2
Comp. syrup hypophosphites.....oz. 3
A teaspoonful three times a day.

Large initial doses of arsenic, 15 to 20 drops three times a day, have been warmly recommended. Murray claims that children may take this amount for several days without disturbing the stomach, and that remarkable results are obtained by it; indeed, that it will cure most cases within a week. The full dose, not less than 15 drops, must be taken and with the food at each meal time.

Most patients are anemic and are benefited by iron. It should be given in large doses. Gould's Cyclopedia says that 10 to 20 drops of the tincture may be taken by children, and 5 to 15 grains of Blaud's pill by older patients. More palatable for children and nearly as efficient is the solution of iron and manganese (the peptomanganate of iron), which may also be prescribed with arsenic. Useful prescriptions are:

Sol. potassium arsenite.....dr. 1½
Sol. iron and manganese peptonate.....oz. 4
A teaspoonful after meals.

Or:

Sol. potassium arsenite.....dr. 1½
Bitter wine of iron.....oz. 3
A teaspoonful after meals.

Or:

Iron citrate .....dr. 2
Simple syrup .....dr. 4
Orange flower water.....oz. 1½
A teaspoonful after meals.—(Hartshorne.)

Syrup iron iodid.....oz. 4
A teaspoonful three times a day.

Cimicifuga is highly esteemd by some. The dose of the fluid extract is 15 to 20 drops three times a day, increased until it produces headache, giddiness and gastric distress. Anders claims to have secured better results from this drug in combination with arsenic than from arsenic alone. The following will be found suited to many cases:

Sol. potassium arsenite.....dr. 1½
Fl. ext. cimicifuga.....oz. 1
Bitter wine of iron, enough to make.....oz. 4
A teaspoonful three times a day.

The bromids are recommended, but are depressing and may do more harm than good. The sodium salt is best and may be tried early in the disease. The fluid extract of conium and hyoscin are efficient sedative drugs. Hyoscin hydrobromate hypodermically ($^1/_{100}$ grain) is often valuable in the chorea of adults. Other drugs recommended are quinin and antipyrin. Both are given in very large doses. The former should be tried when there is reason to suspect a malarial element; the latter is said to be very effective in nervous girls without rheumatic tendency. The doses in which it is usually given (5 to 12 grains at initial dose) are certainly dangerous for children. In rheumatic cases salicylate of sodium occasionally does more good than arsenic, although it modifies the arthritis less than in ordinary rheumatism; it should be given in full doses. Strychnin should be useful where there is evidence of muscular weakness.

If insomnia fails to yield to hygienic and hydropathic measures drugs may be necessary. Either trional, sulfonal or chloralamid usually proves effective, given dissolved in a hot drink about two hours before the hour of sleep. More powerful still as a hypnotic is chloral; this drug seems to have a distinctly quieting influence when the choreiform movements are intense. It may be combined with the arsenic, as in:

Sol. potassium arsenite.....m. 3
Chloral hydrate .....gr. 5
Peppermint water, enough to make.....dr. 1
One dose, to be repeated three times daily.—Vanderbilt clinic.

If evidences of endocarditis appear the child should be kept quiet in bed, an ice-bag placed over the cardiac region and suitable cardiac sedatives administered.

CHOREIFORM MOVEMENTS.

CHOREA MAJOR is characterized by violent general choreic movements. It occurs in epidemics as a result of religious excitement. It was very common in the middle ages. It is distinctly hysterical and should be treated as such.

HYSTERICAL CHOREA.—The movements affect a single muscle or a group of muscles and are rapid and rhythmical. Often the muscles show some rigidity. Swaying of the body and nodding of the head are characteristic symptoms. The treatment is suggestive.

HUNTINGDON'S CHOREA.—A purely hereditary disease, sometimes transmitted from generation to generation. It commences late in life (after the thirtieth year) and is progressive. There are degenerative changes in the cord and brain. The choreiform movements begin in the hand and are not pronounced, but there is usually more or less affection of the face, marked loss of coordination, giving a stumbling gait, a slow, stammering speech, and progressive mental impairment ending in dementia. The disease is incurable. The treatment is purely symptomatic.

ELECTRIC CHOREA occurs most frequently in children of from 7 to 14. It consists of lightning-like contractions in the muscles of one extremity or of the back and shoulder (Henoch) similar to those produced by the passage of an electric current. These sometimes affect the respiratory muscles and cause queer sounds. It disappears in sleep. Its etiology is the same as chorea minor, but it does not yield as readily to arsenic. The bromids are recommended.

PARAMYOCLONUS MULTIPLEX is practically identical with the preceding, except that it occurs in early adult life. The extremities and trunk and, less frequently, the face, suffer. The spasms are less affected by voluntary movement and more apt to be rhythmic.

HABIT CHOREA.—An acquired trick or habit affecting certain muscles of the head or face. Vigorous twitching of the muscles of the eye, cheek and forehead, tossing the head and shrugging the shoulders are all expressions of the disease. Men-

tal suggestion, encouragement and cultivation of the will-power often effect a cure. Massage and gymnastics assist in accomplishing this end.

COLDS AND COUGHS—See Bronchitis and Rhinitis.

COLDSORES—See Herpes.

COLIC, INFANTILE.

ETIOLOGY.—Infantile colic is caused, in most cases, by indigestion. This may be due to too frequent or too rapid feeding, overloading of the stomach, underfeeding, unsuitable foods, as fruits, sweets and farinaceous articles—anything in fact which is likely to impair the digestion and cause decomposition of food with the formation of gas in the intestines. It occurs in breast-fed babies as often as in the bottle-fed. Its most common cause is an excess of protein in the milk. This is shown by the presence of undigested casein in the stools. Chilling of the skin, worms, foreign bodies or inflammation also cause colicky pains in the abdomen.

SYMPTOMS.—If a baby has colic it commences to cry suddenly, drawing up its knees toward the abdomen, which is distended and hard. The hands and feet are cold and sometimes the fontanelle is depressed. The cry of a colicky baby is loud, strident and paroxysmal, ceasing often as suddenly as it commenced, usually after the passage of gas from the mouth or bowel. This gives temporary relief. Sometimes curdled milk is regurgitated.

TREATMENT.—The extremities of the child should be warmed by holding them near the fire, by a hot-water bag or by wrapping them in warm flannel. Gentle rubbing of the abdomen with the warmed hand often gives great relief and may facilitate the escape of gas. This is important. Sometimes a change of position, as turning the child on his stomach and supporting him gently with the hand under the abdomen, with the head slightly lower than the body, will assist in the evacuation of gas. Tucker recommends elevating the buttocks, even to suspending the child for a moment head down; this failing, he introduces a soft-

rubber catheter into the rectum. An enema of a few ounces (4 to 6) of warm water usually gives relief; it may contain a few drops of oil of turpentine, or half a teaspoonful of glycerin. suspended in soapsuds. Sometimes counter-irritation to the abdomen is desirable. In most cases simply warmed flannels are all that is necessary; rarely a very *mild* mustard draft (5 parts of flour to 1 of mustard) or a spice poultice will be found better. (See Appendix.)

Various carminatives, antacids and antispasmodics are prescribed in colic. Dosing with whiskey or brandy and water is indefensible. There are simpler drugs fully as effective and without such attending disadvantages. A little weak sweetened peppermint, cinnamon or anise water, with or without bicarbonate of sodium, relieves most cases; 2 to 5 drops of aromatic spirit of ammonia in water is almost always effective. The ordinary soda-mint tablet may be dissolved in water and slightly sweetened. Approximating it is the following:

Sodium bicarbonate .....dr. ½
Aromatic spirit ammonia.....dr. ½
Peppermint water, enough to make.....oz 2
A teaspoonful in hot water for a child one year of age.

A formula of Dr. Larrabee, which has the advantage of also relieving the constipation, is the following:

Arom. spirit ammonia.....m. 6
Sodium bicarbonate .....gr. 12
Arom. syrup rhubarb.....dr. 1
Caraway water .....oz. 1½
A teaspoonful when needed.

A mixture of equal parts of lime water and cinnamon water acts well in most cases. If, as occasionally happens, the colic is associated with diarrhea, the following is good:

Arom. spirit ammonia.....dr. 1
Bismuth subnitrate .....dr. 1
Syrup .....oz. ½
Half to one teaspoonful when needed.

"Neutralizing cordial" in suitable doses is also good.

In those rare cases where opium is required, paregoric (5 to 10-drop doses) is satisfactory, but one of the following may be tried:

Dalby's Carminative. (Mistura Carminitiva. N. F.)

Magnesium carbonate	Gm.	6.50
Potassium carbonate	Gm.	0.30
Tinct. opium	Cc.	2.50
Oil caraway	Cc.	0.05
Oil fennel	Cc.	0.05
Oil peppermint	Cc.	0.05
Syrup	Cc.	16.00
Water, to make	Cc.	100.00

Dose 8 to 30 minims.

Or—

"Dewee's Carminative." (Mistura Magnesiæ et Asafoetidæ, N. F.)

Magnesium carbonate	Gm.	5.00
Tinct. asafetida	Cc.	7.50
Tinct. opium	Cc.	1.00
Sugar	Gm.	10.00
Distilled water	Cc.	100.00

Shake well. One teaspoonful for a child a year old.—(J. Lewis Smith.)

The temptation is great to dose these little ones with opiates on account of the rapidity of relief, but the habit is greatly to be deprecated. Physicians should make it a duty to warn mothers concerning the danger of constantly resorting to paregoric, the various "soothing syrups" and other opium preparations. Crothers has recently shown what a profound influence they have upon the subsequent physical and mental development of many children.

COLIC, INTESTINAL; FLATULENT COLIC.

DEFINITION.—Acute spasmodic pain in the intestines.

ETIOLOGY.—It is most likely to occur in nervous, hysterical or anemic persons; in many, perhaps most, cases it is a true neuralgia of the bowels. The direct causes are: accumulations in the bowel of coarse or indigestible food; intestinal worms or other irritants; poisonous drugs, such as arsenic, antimony or lead ("lead colic" is a familiar example); diseases of the uterus, liver, kidney or bladder, acting reflexly; autointoxication from gout, malaria or rheumatism; taking cold.

SYMPTOMS.—An attack of colic appears suddenly or is preceded by a short period of abdominal distress. The pain is

usually localized around the umbilicus and comes on in paroxysms, alternating with intervals of comparative relief. It is sharp and tearing in character and may be agonizing in its intensity. The patient usually lies with the limbs drawn up but constantly changing his position or throwing himself from side to side in the effort to obtain a more endurable position. Pressing hard with the hands upon the abdomen gives him some relief. There is flatulence and the patient expels gas from the stomach and bowels. Often there is nausea and vomiting. Constipation is the rule. The abdomen usually is found swollen and tense. The pulse is small and hard, the face pale, anxious and pinched, and a cold sweat starts from the skin. These symptoms may last only a few minutes or may continue for hours.

DIAGNOSIS.—Colic in itself is easily diagnosed, but it is sometimes difficult to differentiate between its different varieties, as renal, hepatic or lead colic. Intestinal obstruction is marked by profound collapse, persistent and finally stercoraceous vomiting and complete obstipation. In inflammatory diseases of the abdomen the pain is associated with fever and constitutional symptoms.

INTESTINAL COLIC	HEPATIC COLIC.	RENAL COLIC.	LEAD COLIC.
Usually follows ingestion of improper food; patients often neurotic; vomiting not followed by relief.	History of recurring attacks followed by jaundice; vomiting often gives relief; calculus in stool; bile in urine.	History of previous attacks; mucus, pus, blood or calculi in the urine.	Occupation exposes to lead-poisoning; blue line on gums; lead in urine.
Pain localized or diffuse, usually most intense around umbilicus.	Pain in hepatic region radiating up to right shoulder and back and down toward umbilicus.	Pain radiating from one kidney along ureter to penis, testicle and thigh; retraction of testicle.	Pain centered about umbilicus.
Abdomen tense and tympanitic.	Abdomen tympanitic.	Abdomen typanitic.	Abdomen retracted.
Chills or fever seldom occur.	Chills and fever frequent.	Pronounced rigors.	No chills or fever; persistent constipation.

PROGNOSIS.—Seldom if ever fatal.

TREATMENT.—If there is evidence of undigested food or irritant matter in the bowel an effort should be made to remove it by the use of an enema of warm water, with soap, oil of turpentine, and castor oil, if needed. Internally a laxative should be given. Castor oil, Rochelle or Epsom salts, or a natural aperient water, such as Hunyadi or Apenta, act quickly; or a full dose of calomel (5 to 10 grains) may be given, followed by the saline purgative in two to three hours. Magnesium sulphate is the best cathartic for lead poisoning.

For the relief of pain, apply to the abdomen a mustard poultice, turpentine stupes, hot fomentations, or a hot linseed poultice. Rubbing the abdomen with warm oils or ointments is frequently grateful to the patient. Severe cases require the hypodermic administration of morphin ($^1/_4$ grain) and atropin ($^1/_{150}$ grain); or anodynes may be given by the mouth. In mild cases aromatic spirit of ammonia (½ dram), tincture of ginger (½ to 1 dram), compound spirit of ether (½ dram),or paregoric (½ to 1 dram) in water will be sufficient. Prescriptions of this class are:

Spir. chloroform .....dr. 2
Spir. ammon. arom.....dr. 2
Tinct. cardamon comp.....dr. 2
Syrup ginger .....dr. 4
Peppermint water, enough to make.....oz. 2
A teaspoonful in water every half hour until relieved.

Camph. tinct. opium.....dr. 4
Chloroform .....dr. 2
Spt. camphor .....dr. 2
Spt. lavender comp.....dr. 4
Aromatic tincture (N. F), enough to make..oz. 2
A teaspoonful in water every half hour until better.

A tablet of codein (½ grain) acts nicely and causes little digestive disturbance. Chlorodyne or Mistura Chloroformi et Cannabis Indicae Comp. N. F., is an excellent preparation for use in colics of all kinds. (See Cholera Morbus for formula.) Sometimes a suppository containing morphin sulphate (½ grain) and atropin sulphate (1-100 grain) will be found more satisfactory than drugs given by the mouth, especially if the colic is due to a reflex from a diseased rectum, uterus or ovaries.

Lead poisoning requires, in addition to the magnesium sulphate to be administered as a laxative, the subsequent use of potassium iodid, 5 to 10 grains three times a day. This enters into combination with the lead and facilitates its excretion.

Subsequent treatment depends upon the cause. In general, correction of errors of diet and proper attention to the regularity of the evacuations of the bowel are important. Neurotic patients should be built up by proper regime, change of scene, and suitable tonics; if anemic, iron and arsenic may be given, and phosphorus (syrup of hypophosphites), strychnin, and cod-liver oil are useful. The uric-acid diathesis requires a regulated diet, and the alkaline diuretics. The salicylates are curative in rheumatism, while malaria yields to quinin.

CONJUNCTIVITIS.

DEFINITION.—Inflammation of the conjunctiva.

VARIETIES.—Catarrhal, purulent, granular, phlyctenular and membranous.

HYPEREMIA AND CATARRH OF THE CONJUNCTIVA.

ETIOLOGY.—Simple congestion or inflammation of the eye may be caused by foreign bodies and by smoke, dust or irritant gases; by a coryza, scarlet fever, measles, etc.; by errors of refraction, eye-strain, or exposure to bright sunlight or strong artificial light. Many cases are undoubtedly due to microbic infection. Contact with leucorrheal or other discharges may excite it, while dirty, improperly ventilated surroundings predispose to it. Epidemics are common and its infectious nature seems well established. There is often an underlying scrofulous diathesis.

SYMPTOMS.—In simple *hyperemia* of the conjunctiva, upon eversion of the lid it is found red and slightly swollen and the vessels injected with blood. The ball of the eye often becomes red and bloodshot. There is a sensation of itching, roughness and smarting as if there were sand in the eye. The flow of tears is increased but there is no mucus discharge.

In *acute catarrhal inflammation* the above symptoms are present, but are more intense and associated with a sticky mucus

secretion which bathes the reddened and thickened lids and causes them to stick together, especially in the morning. There is profuse lachrymation. The symptoms are intensified by any bright light, natural or artificial. The inflammation is at first confined to the lids, but later usually invades the retro-tarsal fold, the caruncle, the semilunar folds and the conjunctiva of the eye-ball. The possibility of invasion of the cornea should always be kept in mind.

In *chronic catarrh* of the conjunctiva the symptoms are less marked, but there is more or less hyperemia, uniform redness and swelling. The secretion is scanty and there is no pathological discharge. The eye-lids feel heavy and there is a constant sense of irritation. There is often blepharospasm and the eyes feel worse towards night, showing eye-strain.

PROGNOSIS.—Favorable under proper treatment.

TREATMENT.—Search should be made for foreign bodies and if any are present they should be promptly removed. After irrigation with a 5 per cent solution of boric-acid, compresses of gauze wrung out of cold or ice-water should be applied over the closed lids in all severe cases of hyperemia or inflammation. The only contraindication to their use is ulceration of the cornea. When this is present, hot compresses are to be used to stimulate circulation. In most cases an antiseptic and astringent lotion is required. Any of the following will be found efficient:

Boric acid	gr. 20
Zinc sulphate	gr. 2
Distilled water	oz. 2

Eye water, to be used with medicine dropper, three or four times a day.

Morphin sulphate	gr. 2
Zinc sulphate	gr. 2
Borax	gr. 10
Camphor water	oz. 2

Eye water. Use as directed.

Morphin hydrochlorid	gr. 1
Boric acid	gr. 10
Distilled water	dr. 6
Rose water	dr. 2

Eye water. Drop in eyes every three or four hours.

Other astringents used are alum, tannic acid (5 to 10 grains to

the ounce), zinc chlorid (1 grain to the ounce), acetate of lead, and nitrate of silver. Ohlemann recommends in chronic cases *in which the epithelium of the cornea is intact* 6 to 10 drops of a 15-per-cent solution of lead water in a wineglass of boiled water to be applied on compresses to the eye (for fifteen minutes at a time) two or three times daily. Ointments sometimes are to be preferred, as,

Yellow oxid mercury .....gr. 2—10
Petrolatum .....oz. 1

Severe and refractory cases are most benefited by nitrate of silver, used in a weak solution (2 to 4 grains to the ounce) in acute cases and in strong solution (10 to 20 grains to the ounce) in chronic cases. It should be brushed directly on the lids by the physician and strong solutions neutralized by washing with sodium chlorid solution.

In hypersecretion Michael uses the following ointment:

Silver nitrate .....gr. 2-5
Petrolatum .....oz. 1

Eye ointment for hypersecretion.

In diminished secretion he uses:

Copper sulphate .....gr. 3-10—7-10
Petrolatum .....dr. 2½

Eye ointment for insufficient secretion.

In cases associated with eczema the following ointment is useful:

Ichthyol .....gr. 3-10—7-10
Starch .....dr. 2½
Zinc oxid .....dr. 2½
Petrolatum .....dr. 6

—Ohlemann.

A drug that has recently been introduced and is of great value in conjunctivitis where there is a great injection or chemosis is the extract of suprarenal gland. It is a most powerful astringent and seems to be completely harmless. It is used in a 5 per cent filtered solution. The following formula is suggested.

Borax .....gr. 5
Adrenal gland, desiccated .....gr. 2½
Camphor water .....oz. 1

Mix and filter. Eye water.

Any treatment to be permanently effective must attack the underlying cause. Errors of refraction should be corrected and

eye-strain relieved, the eyes protected from future irritation and where necessary the hours of work reduced. Colored glasses will protect the eye from bright light. The general health should receive proper attention and any systemic disease attended to.

PURULENT CONJUNCTIVITIS.

ETIOLOGY.—Due invariably to infection with pus-producing germs—nearly always gonococci.

SYMPTOMS.—It commences like catarrhal conjunctivitis with vascular injection, swelling and watery discharge, but the symptoms rapidly become more intense and within 24 hours the lids are greatly reddened and so swollen that they cannot be opened, while between them oozes a copious secretion of thick greenish-yellow pus. The inflammation affects the entire conjunctiva; there is extensive infiltration of fluid beneath it, causing extensive chemosis. The cornea is surrounded by the swollen rim and sometimes almost hidden. Pain in the eyes and temples is intense. The intensity of the process increases until the third or fourth day, after which it slowly subsides, catarrhal inflammation persisting for four to six weeks.

The great danger is involvement of the cornea, which is caused by the checking of the blood supply by the intense swelling and pressure. The first evidence of this is the appearance of one or more areas of grayish infiltration, soon followed by the formation of ulcers. These may not perforate but in any case are likely to leave scars, causing opacity in the line of vision; in extreme cases the whole cornea may be destroyed.

OPHTHALMIA NEONATORUM.—This is a form of purulent conjunctivitis occurring in the new-born. It is caused by contact with infected vaginal secretions. Its symptoms are similar to those seen in adults, though somewhat less violent.

PROGNOSIS.—Very serious. The danger of ulceration of the cornea is great and this may cause loss of vision.

DIAGNOSIS.—The disease is readily recognized. The presence of the gonococcus gives indisputable evidence as to its character.

TREATMENT.—When only one eye is affected the other should be carefully protected from infection with Buller's watch-glass held in place with a perforated adhesive plaster. This should

protect the eye from the fluids used for irrigation; it should be occasionally removed and the eye cleansed.

Cold is of the utmost importance in purulent conjunctivitis. Ice-water compresses should be applied constantly unless there is evidence of beginning infiltration of the cornea in which case they should be replaced by hot compresses. At the same time the eye should receive frequent irrigation. This is absolutely essential to rid the eye of the infecting secretion. For this purpose bichlorid of mercury solution (1 to 5000) may be used, but less toxic drugs are just as satisfactory; solutions of boric acid (1 to 50), normal salt solution or potassium permanganate (1 to 5000) answer the purpose nicely. This solution may be tepid or cold or hot according to the corneal indications. It should be repeated every half hour, an effort being made to reach every portion of the conjunctiva. At least one-half pint should be used at every irrigation. In all manipulations of the eye the intense virulence of the secretion must be kept in mind and care taken that none of the attendants or any other portion of the patient becomes infected.

The drug most commonly employed in this disease is nitrate of silver. It is contraindicated during the acute stage, where the lids are highly inflamed and swollen; it is most valuable in the later stages when the intensity of the inflammation begins to subside. The lids are then to be everted and painted once a day with a strong solution (10 to 20 grains to the ounce) followed by irrigation with salt water. A 5 to 10-per-cent solution of protargol has been recently recommended for the same purpose. It has the advantages of being comparatively unirritating, causes no pain and can be used more frequently and during acute periods of the disease. It is, however, less effectual than the stronger salt. When there is ulceration of the cornea, the nitrate should not be allowed to come in contact with it. Ulceration is also an indication for the instillation of atropin.

After the acute symptoms have subsided the disease should be treated as a chronic catarrh. Stimulating applications are to be used and constitutional measures instituted to build up the general health. Opacities are improved by massage with a weak yellow oxid of mercury ointment.

Yellow oxid mercury .....gr. 1
Petrolatum .....dr. ½—1

Ophthalmia neonatorum.—This is a preventable disease. In attending labor cases where there is a suspicion of gonorrheal infection the vulva and vagina should be carefully cleansed with antiseptic solutions. The use of Crede's solution (nitrate of silver 2 grains to the ounce) effectually prevents the disease in most cases. A few drops of this are instilled into the eye of the new born babe. Protargol has also been highly recommended for this purpose. The treatment of the attack is conducted upon the same principles as in adults,—with cold or hot compresses, frequent irrigations and instillation of the silver salts.

GRANULAR CONJUNCTIVITIS; GRANULATED LIDS; TRACHOMA.

DEFINITION.—A variety of conjunctivitis which is characterized by the formation of small, pinkish granulations with subsequent cicatrization. It is infectious and may be epidemic in crowded or unhygienic institutions.

SYMPTOMS.—The early symptoms of granular lids are slight, consisting of increased lachrymation. Very rarely the symptoms are more acute, as shown by greatly swollen lids and profuse purulent secretion. Characteristic of the disease are the numerous small red granular masses which cover the entire surface of the lid. These finally undergo retrogressive changes, attended with swelling and more or less muco-purulent discharge, and ending in cicatrization. This process continues until a mass of scar-tissue forms, whose contraction causes various deformities of the lid, such as ectropion, and trichiasis. The most serious complications are those of the cornea, taking the form of ulceration or pannus. The latter is caused by the roughened lids rubbing against the cornea, thereby producing a keratitis with the formation of vascular tissue and subsequent opacity.

PROGNOSIS.—Not good. The disease is chronic and the tendency is toward progressive increase of the trouble. Corneal opacities are a frequent complication and are likely to impair the vision.

TREATMENT.—The disease may be prevented by the enforcement of personal cleanliness, the use of separate towels, good ventilation, nourishing food and plenty of fresh air and out-door exercise. These patients are often strumous and need building up. In the early stages of the disease frequent irrigation of the eye with boric acid solution (10 grains to the ounce) or bichlorid (1 to 5000) is of benefit. When the purulent secretion appears, nitrate of silver (10 grains to the ounce of water) should be painted on the lids once daily. When it produces marked irritation its use should be suspended for a time. Boroglycerid (25-50 per cent) is recommended in these cases, alternated with glycerole of tannin, copper sulphate or the alum stick. Later treatment consists in the prolonged use of caustics, such as the copper sulphate pencil, which is applied once a day or every other day to the hypertrophied portions only all excess being washed off; the removal of the granulations with Knapp's roller forceps; grattage, or scrubbing with a firm brush until granulations are removed, followed by bichlorid solution; and excision of the fold of conjunctiva containing the granules. Among remedies proposed are massage with iodoform ointment, applications of 1 per cent formalin and penciling three times a week with

Ichthyol	gr. 50
Distilled water	gr. 40
Glycerin	gr. 10

To be discontinued as soon as the vascularity has subsided.

Pannus is treated by massage or instillation with an infusion of jequirity two or three times daily until inflammation is produced; this is expected to be curative.

Trachoma is an extremely chronic and intractable condition and requires the special skill of an oculist for successful treatment.

PHLYCTENULAR CONJUNCTIVITIS.

DEFINITION.—A form of conjunctivitis characterized by the appearance of one or more grayish phlyctenulæ upon the conjunctiva of the eye-ball. A phlyctenule is a shallow ulcer upon the top of an accumulation of lymphoid cells, around a nerve-filament.

ETIOLOGY.—It usually occurs in improperly nourished children under ten years of age. These children are often strumous. Surroundings or disease which weaken resistance predispose to the occurrence of the disease.

SYMPTOMS.—The patient presents a characteristic strumous appearance, to which are added intense photophobia and blepharospasm. Examination of the conjunctiva shows one or a number of phlyctenulæ—small grayish-red eminences upon the conjunctival surface of the eye-ball. These may be surrounded by areas of injected vessels, or, if the phlyctenulæ are multiple, there is likely to be a general conjunctivitis. Often the phlyctenulæ are found also upon the cornea. The photophobia and lachrymation are marked. There is seldom much discharge.

TREATMENT.—Treatment should be addressed largely to the general condition. Exercise in the open air, the eyes being protected with colored glasses, an abundance of simple nourishing food, frequent bathing with friction, and the internal administration of cod-liver oil, the hypophosphites, iron, arsenic, etc., are indicated.

In the simple form of the disease, where there is not much irritation, a little calomel dusted in the eye is useful, but this should not be used when calomel is being administered internally, because of an irritant chemical combination which is thereby formed. The calomel is believed to be slowly changed into bichlorid by the action of the tears. Instead of this yellow oxid of mercury ointment may be used:

Yellow oxid mercury.....gr. 1
Petrolatum .....dr. 2

In the multiple variety irritating drugs should not be used. The eye should be frequently irrigated with boric acid solution, cold if the conjunctiva only is affected, hot if the cornea is attacked. Atropin should be instilled if the cornea becomes involved.

To relieve the photophobia and blepharospasm May recommends that the child's face be forcibly dipped under water and held there until the eyes are opened. This, repeated several times a day, often gives relief.

MEMBRANOUS CONJUNCTIVITIS.

DEFINITION.—A form of conjunctivitis characterized by the formation of a false membrane upon the inflamed surface.

VARIETIES.—(1) Diphtheritic Conjunctivitis, caused by the Klebs-Loeffler bacillus. (2) Croupous Conjunctivitis, caused by irritants, as nitrate of silver, lime and burns of any kind or various micro-organisms.

DIPHTHERITIC CONJUNCTIVITIS.

SYMPTOMS.—With the great prostration and constitutional disturbance found in diphtheria the lids sometimes become swollen, inflamed and tender and a grayish-white membrane is thrown out upon the conjunctiva; this infiltrates the underlying tissues, making them hard and board-like so that the lid cannot be everted. Compression of the blood vessels and more or less necrosis and sloughing results. At first the discharge is thin and serous, but increases in quantity as the disease progresses. After a week or more the membrane is thrown off or absorbed and the discharge becomes distinctly purulent, the inflammatory process causing considerable loss of structure and frequently invading the cornea. Cicatrization is likely to be extensive, with marked deformities of the lids as a result.

PROGNOSIS.—Not good. There is great danger of invasion of the cornea with subsequent blindness; the death-rate is often high.

TREATMENT.—The same degree of caution is necessary to prevent infection from this disease as in purulent conjunctivitis. These patients should be isolated, since the cause is undoubtedly the specific diphtheria bacillus. Injections of antitoxin and other measures advised for diphtheria should be employed.

Local treatment consists in the use of cold applications during the early stage, replaced by hot ones when the disease is thoroughly established and the integrity of the circulation threatened. Irrigation with antiseptic solutions, such as normal salt, (0.75 per cent), boric acid (10 grains to the ounce), bichlorid of mercury (1 to 5000), and potassium permanganate (1 to 5000) are useful during the early stages. When the membrane has separated the conjunctiva should be painted daily with a nitrate of silver solution (1 per cent).

Implication of the cornea calls for the use of atropin.

CROUPOUS CONJUNCTIVITIS.

SYMPTOMS.—Resemble those of the catarrhal variety except that there is a grayish-white membrane, with a sero-purulent discharge which grows more profuse and thicker as the disease progresses. This membrane, unlike that of the diphtheritic form, *does not infiltrate the tissues* and may be removed, leaving a raw surface beneath. After one or two weeks the membrane disappears and the symptoms become those of the catarrhal form of the disease.

TREATMENT.—Essentially the same as of the catarrhal variety, with cold or hot compresses, irrigation with antiseptic solutions and the use of atropin according to corneal indications. Caustic applications should only be used during the decline of the inflammation. Nitrate of silver (1 per cent) is best.

CONSTIPATION.

DEFINITION.—A diminished quantity of fecal excretion. This may be shown by a decrease in the number of passages or by a lessened amount of fecal matter discharged. The term is a somewhat flexible one, since in some cases two or more stools daily is required, while in others an evacuation every second or third day is sufficient. Nor is the quantity at all stable, since it depends largely upon the character of the food. A diet rich in the coarser vegetables and grains gives a larger stool than does one of milk or meat. The average quantity, according to Einhorn is about 250 Cc. daily.

ETIOLOGY.—Many causes predispose to constipation. They may be briefly considered under the following heads:

1. *Conditions Peculiar to the Individual.*—These include a "bilious" or a nervous temperament, a sedentary occupation and insufficient exercise. Comparatively few cases of habitual constipation occur among the laboring class; prolonged mental work, anxiety or worry, on the other hand, favor its occurrence.

2. *Diet and Drugs.*—Concentrated or astringent articles of foods and drink produce constipation. Among these are milk, meats, teas, wines and brandy. Insufficient water is drunk by many people. The constant resort to cathartic drugs is one of the most prolific causes.

3. *Habit.*—Beyond all question the most common cause of

constipation is neglect or suppression of the calls of nature, resulting in a condition of atony and dilatation of the bowel, obtunded sensibility to the presence of fecal masses and a chronic nervo-muscular weakness in the presence of ordinary stimuli.

4. *Faults of the Intestinal and Associated Organs.*—Included under this head are strictures, tumors, invagination, volvulus, strangulated hernia, hemorrhoids, fistula, uterine displacements and other conditions that furnish mechanical impediment to the emptying of the bowel. Most of these belong to the domain of the surgeon and will not be discussed here. An interesting condition belonging to this class and described by Pennington, Martin and others is thickening of Huston's valves; this impedes the descent of feces into the rectal pouch and is undoubtedly present in many severe cases. Atrophy or weakness of the intestinal muscles is common either as a result of dilatation or in association with general muscular weakness. Einhorn refers to enterospasm or spasmodic contraction of a portion of the bowel as a cause of constipation; it usually has a neurasthenic or neuropathic cause. Associated with the intestinal causes are the various disturbances of the glands, and especially of the liver. Hepatic congestion, torpor of the liver and jaundice are well-known factors in the production of constipation.

5. *Disease.*—Constipation is a symptom in many acute and chronic diseases, especially those which affect or depress the brain or spinal cord. When habitual it is probably due in most cases to weakening of the nervous impulses sent out by the central nervous system. It is usually marked in cases of neurasthenia, hysteria and allied conditions, such as epilepsy and insanity. Dyspeptic conditions frequently give rise to constipation. Of these hyperchlorhydria is the most prominent; others are ulcer, cancer, chronic gastritis and achylia gastrica. The diseases of the liver have already been referred to.

Pathology.—Except in prolonged cases of constipation there is no pathological change in the intestines. In such cases there is likely to be dilatation of the large bowel and especially of the rectum, thinning of the muscular coats and more or less intestinal catarrh.

Symptoms.—Some distension of the abdomen, a sense of fullness and tension, the passage of gas and sometimes colicky pains

are local symptoms of constipation. Inspection and palpation may reveal the presence of a fecal mass in the large bowel. This in very chronic cases may assume the proportions of an abdominal tumor, but has a characteristic doughy consistency and rosary shape. Other symptoms are coated tongue, anorexia, belching of gas, bad taste in the mouth, nausea, vertigo, despondency and irregularities of the pulse. These symptoms are generally believed to be those of auto-intoxication due to the absorption of ptomains from the intestinal tract, but Einhorn, quoting Bouchard, takes issue with this view, since the latter's experiments seem to show that there is no absorption from solid fecal matter. This, however, still remains an open question. After a few days of constipation there is usually a spontaneous evacuation of hardened feces, or the condition may culminate in an attack of diarrhea, to be followed again by constipation. In other cases there seems to be little tendency to recovery, and cathartics are necessary to produce relief. Very rarely the bowels may remain constipated for weeks. In enterospasm, the characteristic symptom is the painful passage of small balls or pencil-shaped feces.

Diagnosis.—There is usually little difficulty in eliciting the fact of constipation, though the physician may be deceived by a concurrent diarrhea which may be apparent rather than real. Efforts at diagnosis are therefore to be directed mainly toward the differentiation of different varieties. *Mechanical obstruction* may usually be recognized by careful physical diagnosis; pain, tenderness and distension are usually referred to one point; the history may point to ulceration following typhoid or dysentery; uterine displacements or rectal disease are readily found. *Gastric disturbances* as a cause of constipation are found by a careful examination of the stomach contents. Examination of the heart, lungs, liver and other organs show the presence or absence of diseases that would cause serious pelvic congestion. *Atony of the bowels* is shown by a relaxed condition of the abdominal walls, bloating and the passage of hardened feces. Masses may be found by external examination; these change their location from day to day, showing no permanent localization.

Prognosis.—The prognosis is good for life. Only very rarely does constipation cause death, and then only by ulceration and

perforation. The prospects for recovery are good under proper treatment, except in cases where there are permanent changes in the bowel.

TREATMENT.—The first effort in treating constipation is to find and remedy the underlying fault. If this is obstructive and can be corrected surgically, treatment should be directed along these lines. In all troublesome cases it is important to make a careful examination of the pelvic organs. Replacement of a retro-displaced uterus, cure of hemorrhoids, fissure or fistula will certainly be of value, although it should be kept in mind that these conditions are more frequently the results than the causes of constipation. But it is certainly true that painful diseases of the rectum, which increase the patient's dread of going to stool, will intensify the condition if it already exists. The advice of Pennington, to examine the rectum above the sphincter for abnormalities of the rectal valves, should be followed in all doubtful cases, since diverticula may be formed above these points in which feces may accumulate. His treatment consists of snipping the valves in order to permit the unobstructed passage of fecal matter into the rectal pouch. In most cases the condition to be treated is one of atony of the muscular coat of the bowel. The indication for treatment is to secure exercise and development of the muscular fibers. The medical treatment is least in importance. The essential conditions for success are met by radical changes in the patient's habit and diet.

Habit.—The patient should be instructed to avoid all mental strain and to cultivate the habit of regular daily exercise in the open air. Walking, bicycling, horseback riding, rowing and simple gymnastic exercises which bring into play the muscles of the abdomen and lower limbs are all useful. Of the greatest importance is the training of the patient to solicit a daily evacuation of the bowels. He should be instructed to go to the closet at a certain hour every day; usually immediately after breakfast is the most satisfactory time. If the attempt is unsuccessful it should be repeated the following morning at the same hour and continued from day to day until the habit becomes a fixed one.

Dietetic Treatment.—Advocate the free drinking of water; most people drink too little. A glass of plain cold water taken at bedtime, another one the first thing in the morning and again

several times during the day between meals is an excellent laxative, serving to promote glandular activity and soften the feces. The diet should contain considerable proportions of fresh or cooked fruits, such as oranges, figs, prunes, apples, peaches, pears, grapes; such vegetables as lettuce, spinach, cauliflower, cabbage, carrots, turnips, tomatoes, onions and green peas; rye, whole-wheat, graham and the coarser breads, with plenty of butter; salmon, fats and oils, salads made with oil; honey, lemonade, cider, buttermilk, etc. If atonic dyspepsia is present this diet list must be modified, a larger percentage of albuminoids being given, and sweets, starches, etc., which might excite fermentation, excluded. Infantile constipation is often caused by too large a percentage of casein in milk. It can be relieved by increasing the amount of fat or cream.

Mechanical Treatment.—*Massage* is applied mainly along the line of the colon and consists of gentle patting and kneading of the muscles and sometimes of the bowel itself in order to promote peristalsis and increase the nutritive circulation. It is best employed by a skilled masseur and should be continued for ten to fifteen minutes at a time in an adult, five minutes in an infant. It can sometimes be practiced to good advantage by an intelligent patient. As a substitute for this the cannon-ball has been used. This weighs four or five pounds and is usually covered with flannel or chamois skin. It is rolled over the abdomen, following the course of the colon, once daily for five to ten minutes. *Electricity* produces good results in atonic conditions of the intestine, but is contra-indicated when there is spasm. The skin is faradized or one electrode is introduced into the rectum and the other placed on the abdomen. In the latter case the galvanic current is usually employed. Static electricity has produced cures in obstinate chronic cases.

Hydrotherapy.—Cold sponging or bathing followed by friction is a valuable adjuvant to other treatment. Cold sitz baths are useful, but must not be used by menstruating women. Cold compresses across the abdomen and the use of the alternate hot and cold douche upon the abdominal wall are other measures recommended. *Injections* are useful to empty the lower bowel. They may consist of hot or cold water and be combined with soap, castor-oil, turpentine, salt, etc. Large enemas of warm

water should not be used continuously, since they tend to further relaxation of tissues which are already in an atonic condition. Small enemas of cold water have a better effect upon the bowel. Klemperer recommends the injection of half a pint of water at bedtime, which is to be retained. This is absorbed and produces a movement of the bowels the following morning. These injections are taken daily for two or three weeks, then less often. Similarly, one pint of warmed sweet-oil may be injected and retained as long as possible. After two or three weeks it is taken every other night, then at longer intervals. Glycerin, from a dram to an ounce, alone or dissolved in water, when injected into the bowel produces rapid and thorough evacuation, but causes considerable irritation. It may also be given in the form of suppositories.

Medicinal Treatment.—This cannot be dispensed with in many cases, but should be regarded as an adjunct to the hygienic measures already recommended. Active cathartics produce violent peristalsis and a flow of the intestinal secretions, but the after-effect may be to weaken an already atonic structure. In giving drugs for the relief of constipation we should therefore use as mild ones as possible and aim to decrease rather than increase the doses.

Large accumulations of fecal matter, which dilate the intestinal walls and produce serious injury of their mucous and muscular coats, frequently require the administration of the more active purgative drugs in considerable dosage. Also, acute illness often requires the immediate emptying of the bowel, and resort must be made to the drugs best suited to this purpose, but where constipation persists different kinds of drugs are necessary.

In inflammatory conditions of the bowels violent cathartics are contra-indicated. If it is necessary to clean out the intestinal tract, colonic irrigation and salines by the mouth are the most satisfactory. Purgatives are also contra-indicated when there is spasm of the bowel (enterospasm). In these cases frequently a small dose of opium, belladonna or other antispasmodic will prove more effective than laxative drugs.

Of the various laxative drugs used in constipation the most generally valuable are cascara sagrada, aloes, podophyllin, jalap

and senna; these are combined with strychnin or nux vomica, belladonna, hyoscyamus, physostigma, ipecac and other drugs, in order to increase their efficiency or minimize some of their unpleasant effects. All things considered, probably cascara is the best remedy for continued use, since it is said to leave but little constipating after-effect; it may be secured in many elegant and practically tasteless forms, such as elixirs or cordials, but the bitter fluid extract is really the best preparation. The dose is 10 to 40 minims, to be taken two or three times daily. It may also be given in the form of a pill. The following is a good one:

Ext. cascara sagrada .....gr. 40
Ext. belladonna .....gr. 2
Ext. nux vomica .....gr. 2½

Make into 20 pills. One or two at night or night and morning.

The nux vomica has a tonic effect upon the muscular fibers and the belladonna allays spasm and prevents griping.

Aloes acts principally upon the lower bowel; it should not be given when there is irritation of the rectum. It is one of the most valuable drugs in habitual constipation. It is usually given as aloin, with strychnin, belladonna and other drugs. Some well-known combinations are:

Aloin .....gr. 3 to 5
Strychnin sulphate .....gr. to ½
Ext. belladonna .....gr. 2 to 2½

Make into 20 pills. One pill at bedtime.

Aloin .....gr. 4
Strychnin sulph. .....gr. ⅓
Ext. belladonna .....gr. 2½
Ipecac .....gr. 1½

Make into 20 pills. One or two pills at bedtime.

Podophyllin acts mainly upon the upper bowel and is particularly useful when there is "torpor" of the liver. Many cases do well under a combination of this drug with aloes. Hare recommends:

Resin podophyllum.....gr. 2 to 4
Ext. nux vomica .....gr. 4
Ext. physostigma .....gr. 3
Ext. belladonna .....gr. 4

Make into 20 pills. 1 pill night and morning.

Rhubarb is often contra-indicated on account of its astringent after-effect, but it is a valuable stomachic tonic, and in dyspeptic constipation is often useful. Where there is hyperacidity it may be given with an alkali, as in the following:

Powdered rhubarb .....oz. ½ to 1
Calcined magnesia .....oz. ½ to 1
Bicarbonate of sodium .....oz. ½ to 1
Spir. peppermint, a sufficient quantity.

One-half teaspoonful two or three times daily. Ext. belladonna (⅛ grain) may be added to each dose. In atonic dyspepsia it is useful combined with a mineral acid and a bitter tonic. Rhubarb is a good laxative when there are hemorrhoids.

Senna acts principally upon the small intestine and produces a large mushy stool; it does not gripe. The confection of senna (1 to 2 drams) or, better, compound licorice powder may be taken. The latter has the following composition:

Senna leaves .....dr. 2½
Licorice root .....dr. 2½
Fennel .....dr. 1¼
Washed sulphur .....dr. 1¼
Sugar .....oz. 1

A teaspoonful at bedtime.

The salines and the natural aperient waters (Hunyadi, Carlsbad, Apenta, etc.) are not suited to continued use because of the amount of fluid which they abstract from the body and their tendency to produce anemia. They are particularly useful in cases of pelvic congestion, in obesity and in lithemic subjects.

In young children 5 to 10 grains of phosphate of sodium in milk, a teaspoonful of olive oil or the soap suppository will be found sufficient. More fat is usually necessary in the food. Older children may take syrup of figs, cascara cordial, the solution of citrate of magnesia, or rhubarb and soda mixture (Mistura Rhei Comp. N. F.).

Fl. ext. rhubarb .....Cc. 1.20
Fl. ext. ipecac .....Cc. 0.20
Sodium bicarbonate .....Gm. 2.40
Glycerin .....Cc. 25.00
Peppermint water, enough to make....Cc. 100.00

CONSUMPTION—See Tuberculosis.

CONVULSIONS, INFANTILE.

DEFINITION.—Spasm of the voluntary muscles occurring in young children.

ETIOLOGY.—Convulsions are most likely to occur in rachitic, nervous and poorly-nourished children, during the first year of life. The exciting causes include disease or injury of the brain or its membranes, severe burns, injuries or shock, and uremic, ptomain, lead or other poisoning. A convulsion often replaces the initial chill of malaria, pneumonia and other acute diseases. High temperature during fevers often produces convulsions, and they may be a reflex symptom of teething, phimosis, worms, nasal obstruction, etc. The most common cause is some form of gastro-intestinal disturbance, often from an improper quantity or quality of food.

SYMPTOMS.—An attack is frequently preceded by nervousness, restlessness, and twitching of the muscles of the face, the eyelids, hands and feet. In the mildest form the symptoms may develop no farther. Usually, however, a violent convulsion follows with little or no warning. The face becomes pale, the eyeballs roll or become fixed and glassy, the teeth are gnashed together and there is frothing at the mouth; the twitching of the muscles increases in intensity and rapidly spreads to other groups until all the voluntary muscles of the body are involved in a violent paroxysm. During the spasm the thumbs become flexed upon the palms and the fingers close over them; there may be involuntary evacuations of the bladder and bowels. Impeded respiration is a result of the spasm, and threatens asphyxia. The patient is always unconscious in a true convulsion. Usually after a few minutes to half an hour the symptoms disappear and the patient falls into a deep sleep, with evidence of great prostration. If the cause still persists other attacks are likely to follow, often at short intervals.

PROGNOSIS.—A severe convulsion may cause immediate death from asphyxia, but this is rare. The danger is greatest in very young or feeble children, and is increased by prolongation of the spasm or frequent recurrence of the attacks.

TREATMENT.—The aim should be to ascertain the cause and

remove it as soon as possible. When this is a gastro-intestinal irritant, washing out the stomach with warm water by means of a soft-rubber catheter, and irrigation of the colon will remove it most quickly. Vomiting may be induced, if thought necessary, by tickling the fauces, a draught of warm salt water, or a grain of turpeth mineral. A full dose of calomel (1 to 2 grains), or several small, repeated doses ($^1/_{20}$-$^1/_{10}$ grain every half hour or hour) serves to clean out the bowels and is useful in intestinal sepsis. An inflamed gum should be lanced. High temperature requires the cool pack, bath or sponging, or small doses of an antipyretic, such as acetanilid, phenacetin, etc. Antipyrin in grain doses may be combined with one of the bromid mixtures given later.

It is customary in case of infantile convulsions to order the patient to be put into a hot bath. This serves well in most cases, but great care should be taken that it is not so warm as to scald the little patient. Cold compresses should be placed upon the head. A mild mustard draft (1 part of mustard to 5 of flour) to the back of the neck or epigastrium is useful in severe cases. Simon recommends a blister, but it is unnecessarily severe. In case of prostration or threatened collapse the mustard pack may be used. This consists in wrapping the child in a towel wrung out of warm water containing ground mustard (a tablespoonful to a quart of water), after which he is wrapped in a flannel blanket. This is kept on for 10 or 15 minutes and is repeated every two or three hours if necessary.

The bromids and chloral are given to prevent recurrence, as in the following:

Chloral hydrate	gr.	15-30
Potass. bromid	dr.	1-2
Syrup	oz.	½
Peppermint water, enough to make	oz.	2

A teaspoonful every three hours.

This may be given in double doses by the rectum, or chloral (5 grains) may be dissolved in milk and used as a high enema. Two teaspoonfuls of mixture of asafetida is also used in the same way. Irrigation of the rectum with warm water should of course precede the introduction of drugs. Jules Simon recommends the following combination:

Chloral hydrate .....gr. 15
Potassium bromid .....gr. 15
Syrup codein .....gtt. 10
Tinct. musk .....gtt. 10
Tinct. aconite .....gtt. 10
Orange flower water.....oz. 3½

A teaspoonful every hour, then at larger intervals. This quantity should suffice for twenty-four hours.

Others are:

Antipyrin .....gr. 16
Sodium bromid .....dr. 1
Arom. spt. ammonia.....dr. ½
Syrup cinnamon, enough to make.....oz. 2

A teaspoonful every two hours.

Or—

Potass. bromid .....dr. 1
Chloral .....dr. ½
Fl. ext. gelsemium.....gtt. 40
Fl. ext. valerian .....gtt. 40
Syrup cinnamon .....oz. 1
Chloroform water, enough to make.....oz. 2

A teaspoonful every half-hour to one or two hours.

For the immediate control of the convulsions there is nothing better than the inhalation of chloroform. Sometimes hypodermic injections of morphin ($^1/_{50}$-$^1/_{100}$ grain) are necessary; it may be given as an adjunct to the chloroform and supplemented by the bromids and chloral as already directed.

CONVULSIONS, PUERPERAL—*See* Eclampsia.

CORNS.

DEFINITION.—A corn is a thickening of the horny layer of the skin, usually conical in shape, with the base upward, caused by friction or the pressure of improperly-fitting shoes; it extends downward and presses upon the sensitive underlying layers of skin and subjacent tissue. "Soft corns" are situated between the toes and are due to moisture and pressure.

TREATMENT.—Any treatment of corns, to be effective or give permanent results, presupposes the removal of the exciting cause. In other words, properly-fitting shoes must be worn and the part protected from pressure.

To cure, soak thoroughly in warm water containing sodium bicarbonate or caustic soda, or soften the hardened layers by the

application of a soap poultice; then scrape with a knife, rub down with a bar of "Sapolio," or shave off as much as possible of the outer cuticle, after which one of the following salicylic acid-collodion preparations may be applied for four or five consecutive nights. If the treatment is successful the corn may then be lifted out, after taking a hot foot bath. If unsuccessful, repeat the process:

Salicylic acid	dr. 1½
Extract cannibis indica	gr. 10
Collodion	oz. 1

Or use—

Salicylic acid	dr. 1
Extract cannabis indica	gr 5
Oil of turpentine	dr. ½
Glacial acetic acid	m. 10
Cocain	m. 10
Collodion, enough to make	oz. 1

Or—

Salicylic acid	gr. 30
Lactic acid	gr. 20
Collodion, enough to make	oz. 1

Ointments or plasters to be used after the preliminary treatment already described are:

Salicylic acid	dr. 1
Resin	dr. 2
Beeswax	dr. 1
Lard	dr. 4
Sweet almond oil	dr. 1

To be applied upon cloth.

Salicylic acid	gr. 40
Soap plaster, enough to make	oz. 1

Spread upon cloth and apply to the corn. After four or five days of application treat in the same manner as where the collodion solution is used.

Dyer (New Orleans Med. and Surg. Jour.) prefers the salicylic acid plaster in flat corns. He says that it should be applied and left on for several days, being renewed as it washes off in the bath. "After three or four days the corn will be seen to grow white and soft, and usually may be rubbed off in washing. If not, then simple rubber adhesive plaster should be applied just as the other plaster, and should be kept on in the same way until the skin level is normal. This procedure may have to be per-

sisted in for several weeks, the alternating salicylic acid plaster and adhesive plaster being kept up until the skin has a normal level." If the corn is inflamed it is well to apply diachylon plaster until the inflammation is relieved.

For "soft corns" remove the softened skin as directed, dry carefully and apply any good dusting powder. Tannic acid makes a good application. Keep the toes separated by a pledget of cotton-wool and wash the feet daily with soap and water. Painting with a 10 per cent solution of nitrate of silver every third or fourth day is often useful. When there is much moisture Dyer recommends a powder of salicylic acid, resorcin or thuja in 5 per cent strength with compound stearate of zinc.

After a little preliminary treatment there is usually little difficulty in lifting out a corn, hard or "soft," with a dull lancet. To prevent recurrence, cover the spot with a dusting powder or a bland antiseptic ointment and protect it from pressure by wearing a perforated felt ring or "corn plaster" until the trauma has completely healed.

CORYZA—See Rhinitis, Acute.

CROUP, SPASMODIC.

DEFINITION.—Laryngeal spasm excited by catarrhal inflammation and characterized by hoarse ringing cough and dyspnea.

ETIOLOGY.—Heredity is often a factor. It occurs in children two to five years of age. Enlarged tonsils and adenoids are predisposing causes. Exciting causes are exposure to cold and indigestion.

PATHOLOGY.—The morbid changes are those of a catarrhal inflammation elsewhere. The dyspnea is due to a reflex nervous spasm of the laryngeal muscles.

SYMPTOMS.—Upon the day preceding the attack the child may be usually well or present the symptoms of a mild catarrhal inflammation, with coryza and a "croupy" cough. The seizure usually comes on in the night, the patient waking with a hoarse, ringing metallic cough, followed by dyspnea. Breathing is very difficult; the face is anxious, the nostrils are distended, the respiration noisy; there is frequently marked recession of the thoracic spaces. The skin is bathed in sweat and in extreme

cases there is cyanosis. The temperature is elevated (101° to 103° F.) and there is evidence of catarrhal inflammation of the mucous membranes of the eyes, nose and throat.

After a variable time, from a few minutes to two or three hours, the dyspnea disappears, the cough becomes less hoarse, expectoration is increased and the patient falls into a quiet sleep. Usually there remains more or less catarrh with fever, cough and discharge from the upper air passages. The disease is likely to recur nightly for several days.

DIAGNOSIS.—The diagnosis is usually easy. The only diseases with which it is likely to be confused are membranous croup, laryngeal diphtheria and laryngismus stridulous.

SPASMODIC CROUP.	MEMBRANOUS CROUP.	LARYNGISMUS STRIDULUS.
Children two to five years of age generally attacked.	Occurs most frequently in childhood, but no age exempt.	Young rickety children under two years of age generally attacked.
Preceding attack patient is perfectly well except for coryza and croupy cough.	Early symptoms show general weakness, chilliness and fever; sore throat, but no cough.	Appears abruptly; no premonitory symptoms.
Attack marked by fever, hoarse cough and dyspnea, followed by complete relief, no sore throat.	Attack marked by fever, muffled cough, sore throat and dyspnea; relief not complete; no remission; great depression.	Attack marked by dyspnea, general muscular spasm and peculiar crowing sound; no cough, coryza or fever.
No membrane.	False membrane.	No membrane.
Purely local; tends to recovery.	A general disease; profound sepsis.	A pure neurosis.

PROGNOSIS.—The disease almost invariably ends in recovery.

TREATMENT.—Hot compresses or hot poultices applied to the neck serve to relax the spasm. In severe cases the patient may be placed in a hot bath with a cold compress around the neck. The inhalation of hot steam seems to give some relief and the addition to it of a little creosote, turpentine or compound tincture of benzoin is of advantage. Conducting the steam from a tea-kettle into a croup tent in which the patient lies is a convenient mode of administration.

Drugs given to relax the spasm include first the emetics. These are especially valuable in cases of indigestion. One or two drams of wine of ipecac, a dram of syrup of ipecac or three to five grains of turpeth mineral are the common drugs used to produce vomiting. In these cases it is also a good plan to empty the bowels with an enema and administer small repeated doses of calomel until the bowels move naturally. Chloral and the bromids are also recommended to relax spasm. A modification of Holt's (New Orleans) formula is:

Chloral	gr. 75
Potass. bromid	gr. 45
Ammon. bromid	gr. 30
Syrup cinnamon	oz. 1
Chloroform water, enough to make	oz. 2

One teaspoonful for a child five years old, to be repeated in twenty minutes if necessary.

Crandall recommends antipyrin in cases in which the spasmodic feature is most pronounced; 2 grains are given at a dose, to a child two years of age, repeated in forty-five minutes if necessary and given twice the following day to prevent recurrence. The catarrhal indications are met by brown mixture in tablets. Expectorants containing ipecac are particularly valuable during the interval between the attacks, as—

Syrup ipecac	dr. 3
Brown mixture	oz. 1
Liquor potass. citrat, enough to make	oz. 2

A teaspoonful every three or four hours for child five years of age.

A little sodium bromid may be added to this to good advantage in some cases, or a dose or two of the bromid mixture above may be given in the evening preceding the expected attack.

In the intervals, careful regulation of diet, warm clothing and avoidance of exposure should be directed. If there are adenoids or enlarged tonsils they should be removed. Tonic or alterative drugs, such as syrup of iron iodid, syrup of hydriodic acid or syrup of hypophosphites may be prescribed.

CYSTITIS: CATARRH OF THE BLADDER.

DEFINITION.—Inflammation of the mucous membrane of the bladder.

VARIETIES.—Acute and chronic.

ETIOLOGY.—The disease in most—possibly all—cases is due to microbic infection, but as elsewhere in the body, there must first be impairment of the resisting power. This is produced by vesical irritation as a result of retention of the urine, the introduction of sounds or catheters, the presence of calculi, neighboring inflammation, trauma, local tuberculosis, sexual excesses, irritant drugs (turpentine, cantharides, cubebs, copaiba, mustard, etc.), and sudden atmospheric changes or exposure to cold.

The infecting germs usually find their way into the bladder from an inflamed urethra or prostate, or from a diseased kidney through the ureter. Less often they migrate from the rectum, vagina, uterus or its appendages. Often the specific bacteria of acute diseases are eliminated in the urine, as in typhoid fever, but cystitis is not a necessary consequence. According to Taylor the colon bacillus is the most common exciting cause of the disease. Other micro organisms found are the streptococcus pyogenes, the proteus vulgaris, staphylococci, tubercle bacilli, etc. The gonococcus often reaches the bladder, but probably only acts as a cause when there is a mixed infection.

PATHOLOGY.—In the milder cases there is simply a hypermia of the mucous membrane with some exfoliation of the epithelium. In more severe cases the mucosa becomes swollen and edematous, its vessels are intensely engorged, there is extensive denudation and a copious secretion of grayish, tenacious mucus or muco-pus. There is often necrosis of the epithelium in patches, minute points of hemorrhage, sometimes ulceration and rarely abscess formation in adjacent tissues. Usually the inflammation is most intense in the neighborhood of the trigone, but the whole bladder wall may be affected. In the chronic form hyperemia and hemorrhages are less marked, but there is likely to be considerable thickening of the walls with contraction and decreased capacity of the organ, while necrotic changes are more pronounced. The urinary changes are due to the action of the

bacteria, which cause decomposition of the urea with formation of ammonium carbonate; this coagulates the pus and increases its tenacity.

SYMPTOMS.—The prominent symptoms of the acute form are as follows: Pain felt over the region of the bladder and radiating to the end of the penis, sacrum, perineum and thighs; it is increased by pressure, decreased by lying down and momentarily relieved by urination. Tenesmus is constant and affects both bladder and rectum. The urine is voided every few minutes, often only a few drops at a time, the desire for micturition being incessant. Fever as a rule is absent, but there may be a moderate elevation of temperature throughout the course of the disease (100°-102° F.). In the septic or phlegmonous forms it may be high (104°-105° F.), and associated with chills and sweating.

The urine at first may be slightly acid, but soon becomes alkaline; it contains tough, stringy mucus, pus, and epithelium; it is cloudy and occasionally stained with blood. Further examination shows the presence of albumin, amorphous phosphates, triple phosphates, ammonium urate and various bacteria. The quantity of urine passed in twenty-four hours is usually about normal.

The symptoms of *chronic cystitis* are similar to those of the acute form, but the pain and tenesmus are less severe, while the amount of mucus, pus and albumin is larger. The patient urinates 10 to 12 times in the twenty-four hours. The disease always produces pronounced debility and emaciation.

DIAGNOSIS.—The diagnosis of cystitis is usually easy. There are, however, some conditions with which it may be confused. The subjective symptoms of acute cystitis, posterior urethritis and prostatitis are much alike.

Posterior urethritis may be differentiated by passing the urine into three glasses: If this disease is present the mucus and pus goes into the first glass, the second contains only what may be at the neck of the bladder and the urine in the third glass is clear; in cystitis the third glass would contain the mucus and pus, since this collects at the base of the bladder and is voided last. In the alkaline urine of cystitis the pus becomes very tenacious and

adheres tightly to the vessel in which it is placed; this is characteristic of cystitis.

In acute prostatitis the three glass test may be used. The urine is voided with some difficulty, there may be suppression, there is pain in the rectum when sitting down and rectal examination shows the presence of a tender tumor.

In vesical irritability the patient is neurotic, pain is worse after micturition and the urine does not contain mucus or pus, but is either highly concentrated or diluted.

In acute nephritis there are casts in the urine, the percentage of albumin is larger, and vesical tenderness and tenesmus are absent. Hypertrophy of the left ventricle and increased arterial tension are present in contracted kidney.

In pyelitis there is tenderness in the region of the kidney and often marked enlargement of that organ. In pyelitis the pus is found in acid urine. Microscope clears up the diagnosis.

PROGNOSIS.—Acute cases usually rapidly recover. In septic cases the danger is greatly increased. Chronic cystitis is always protracted and rarely curable. The commonest and most dangerous complication is septic pyelonephritis. In the tubercular form general infection may follow the local lesion.

TREATMENT.—In the treatment of *acute cystitis* it is essential that the patient have perfect rest in bed, from which he should only rise to empty the bowels or bladder. The bed-pan should not be used, since urination in the recumbent posture is often incomplete, leaving behind a small residue of irritant urine. Hot fomentations over the supra-pubic region, hot sitz baths and, in women, hot vaginal douches are beneficial and relieve the severity of the symptoms. Guiteras recommends hot rectal irrigations with saline solutions, given at a temperature of 110°-120° F., or as hot as can be borne. They can be used by the patient while in the sitz bath if preferred. These hydrotherapeutic applications seem to reduce the inflammatory conditions.

The diet should be unirritating and bland—liquid as far as possible during the acute stage. Milk is most suitable, and an exclusive milk diet is often desirable. It is best given diluted with lime-water, Vichy or other alkaline water. The meat broths, gruels and soft-boiled or poached eggs are suitable for these cases and most vegetables are allowable. Williams recommends those

that grow above the ground, as celery, spinach and lettuce. Rich foods, prone to fermentation in the stomach, condiments and alcoholic drinks should be excluded, and red meats are not permissible in the acute stages or in gouty or rheumatic diatheses.

At the beginning of the attack a calomel purge should be administered and the bowels should be kept open by the use of a daily morning dose of one of the saline laxatives, as magnesium or sodium sulphate, Hunyadi, Apenta, Friedrichshall or other natural mineral water. Sodium phosphate in a one or two teaspoonful dose in half a glass of hot water is excellent.

On account of the irritant character of the urine its quantity should be increased as much as possible. Water is the best dilutent. It should be drunk in large quantities. Pure spring water or distilled water answers the purpose very well, or some of the more elegant alkaline drinking waters may be used. Flaxseed, slippery elm and other demulcents are probably inert. If the urine is acid, as is most commonly the case in acute cystitis, the alkaline diuretics are indicated. Potassium citrate in 20 to 30-grain doses three or four times daily is useful. This may be combined with urinary antiseptics and antispasmodics if desired. Of the first, buchu, uva ursa, triticum, salicylate or benzoate of sodium or salol, and of the latter belladonna, hyoscyamus, morphin or codein are used. It is generally wiser, however, to give the antispasmodic as a suppository and the antiseptics are most useful in alkaline urine.

A very palatable and effective way in which to administer the citrate is as a lemonade in half a glass or more of water, acidulated with a little lemon juice and sweetened to suit the patient's taste, or as:

Potassium citrate	oz. 1
Syr. citric acid	oz. 2
Water, enough to make	oz. 6

A dessertspoonful every three hours.

Pancoast recommends bicarbonate of potassium in the following:

Morphin sulphate	gr. 1
Tinct. gelsemium	dr. ½
Potassium bicarbonate	dr. 2
Water	oz. 3

Two teaspoonfuls well diluted every 3 hours.

Foster (St. Paul Med. Jour.) recommends:

Liquor potass.....dr. 2
Mucil. acacia .....oz. 1
Tinct. hyoscyamus, enough to make.....oz. 4
One teaspoonful in water every four hours.

If the urine is already alkaline, and especially if it is ammoniacal, we should prescribe urinary antiseptics. Of these, benzoic acid and its ammonium and sodium salts have long held the first place. These are usually given combined with buchu or uva ursa, themselves valuable drugs in cartarrhal conditions of the urinary tract. The benzoic acid may be administered in 5-grain doses and its salts in 10-grain doses every three hours, as follows:

Benzoic acid .....gr. 5
Infusion buchu .....oz. ½

Or—

Ammonium benzoate .....gr. 10
Infusion buchu .....oz. ½

Salol in 10-grain doses and boric acid in 10 to 20-grain doses are highly esteemed remedies.

Oil of sandalwood in 10-minim doses is recommended for use during the acute stages, especially in gonorrheal cystitis. When the symptoms begin to decline and the secretion of pus is diminishing oil of turpentine, copaiba, cubebs, pichi, and minute doses of cantharides will be found useful. Urotropin, a newly introduced drug, a formalin derivative, is giving remarkably good results in the treatment of alkaline cystitis. It is a powerful urinary antiseptic, and in cases of bacteriuria quickly destroys microbic life and deodorizes the urine. The author has frequently found this drug effective when other remedies have failed. Its average dose is 7½ grains, given two or three times daily.

Pain and tenesmus are the most trying symptoms of acute cystitis. These are best relieved by the use of suppositories containing opium, belladonna and similar drugs. The following formula is good:

Morphin sulph. .....gr. ¼
Ext. belladonna .....gr. ¼
Cacao butter, a sufficient quantity.....

Sometimes the internal use of remedies is necessary; ¼ to ½ grain of codein is least likely to disarrange the stomach. It may be combined with camphor, as recommended by Williams. He also uses the following where the opium preparations are undesirable:

Potass. bromid	gr. 15
Ammon. bromid	gr. 15
Camphor water	oz. ½

One dose, to be given once or twice a day.

Cocain is also recommended to be used by vesical instillation. Tyson says that not more than 2 grains should be used at once. It is, however, at best a dangerous drug and should be used with care.

If the disease shows a tendency to linger and the urethra is not too sensitive irrigation of the bladder should be employed. This should be done with the utmost care as to antisepsis, since infection by means of the catheter is much too frequent. A glass catheter is best since it is most easily kept clean, is readily sterilized by boiling, does not corrode and is cheap. Web or rubber catheters, if used, after the best possible cleansing should be sterilized in a formaldehyde apparatus. It should be remembered that the urethra is not necessarily sterile; it is therefore wise to wash it out with a Janet apparatus before passing a catheter into the bladder. This should pass just within the vesical sphincter and the fluid introduced by hydrostatic pressure with a fountain syringe.

Guiteras considers the permanganate of potassium solution the best irrigant used in a strength of 1 to 4000, gradually increased to 1 to 1000. Nitrate of silver is probably the most popular drug. Commence with 1 to 16,000 and increase to 1 to 3000 or 4000. Bichlorid of mercury 1 to 10,000 and boric acid or boroglycerid in solution are also recommended. Normal salt solution is excellent and in many cases as effective as more powerful drugs. The irrigant should approach the specific gravity of the blood; it should be introduced very slowly; too much should not be used at a time; one to three injections may be given daily; its temperature should be about 105° F. to 110° F.

When the bladder is very intolerant, instillations should be given instead of irrigations. These are introduced by a small

syringe similar to a medical dropper or by a graduated glass syringe through a glass or metallic catheter. Only small quantities are used. Nitrate of silver is the favorite drug. It is well to commence with the strength of 1 grain to the ounce and gradually increase to 10 grains to the ounce. Of this about 10 minims should be instilled every other day. Williams praises for this purpose the following application:

Carbolic acid	m. 10
Glycerin	oz. 1
Lime water	oz. 3

Cumston uses sublimate solutions for instillation, commencing with a 1:4000 solution and increasing the strength according to the tolerance of the bladder. He instils from 2 to 4 Cc., and from 10 to 15 drops of this is placed in the neck of the bladder and posterior urethra.

Iodoform is also used locally, in 5-per-cent solution in liquid petrolatum, and Richardson (Med. Review) praises europhen, giving not to exceed 10 grains in an ounce of pure olive oil.

In *chronic cystitis* the treatment must be mainly local. Few drugs are of great value given internally. Probably the most useful is urotropin, which serves to check the multiplication of bacteria and perhaps prevents the further progress of the disease. Oil of sandalwood, oil of copaiba, terebene and other balsamic urinary antiseptics are used. These are generally best prescribed in soft capsules. Salol and boric acid are good internal antiseptics and buchu, uva ursa and other drugs of this class are useful urinary stimulants. Regulation of the diet along the lines already described, and attention to the digestion and the bowels are, of course, important.

The local treatment consists in vesical irrigation or instillation with the same solutions and in the same manner described for the declining stage of the acute form of the disease. Cases that resist this treatment should be examined carefully with the cystoscope of Kelly or Powlik, and if an inflamed or ulcerated patch of mucous membrane is found a strong solution of nitrate of silver (20-30 grains to the ounce) should be applied to it directly, after which the bladder should be irrigated.

If, in spite of these methods of treatment, the symptoms of the disease continue with progressive failure of the health an

operation for permanent drainage of the bladder is justified. The suprapubic or perineal operation may be performed in males and a vesico-vaginal fistula established in females. This relieves the inflamed mucous membrane and allows it to heal under suitable applications. In tubercular cystitis, the diseased area should be removed as thoroughly as possible by curettement. This operation has been performed with good results in the catarrhal form of the disease when there was thickening of the mucous lining. Contraction with decreased capacity of the bladder is treated by distention with an irrigating fluid, the quantity of which is gradually increased.

DANDRUFF—See Alopecia.

DENGUE; BREAK-BONE FEVER; DANDY FEVER.

DEFINITION.—An acute, infectious fever, occurring in warm climates and characterized by high fever, one or more remissions, severe muscular and arthritic pains and cutaneous eruption.

ETIOLOGY.—McLaughlin has described a micrococcus which he believes to be the exciting cause. The disease is contagious, occurs in epidemics in tropical or subtropical climates, especially in sea-coast cities, is checked by frost and is uninfluenced by age, sex or race.

SYMPTOMS.—After a period of incubation of two to five days, an attack commences suddenly with a chill, followed by rapid elevation of the temperature (103°-105° F.), intense headache and severe pains in the back, muscles and joints, associated with slight tenderness upon pressure and stiffness when an effort is made to move, giving a characteristic "dandy-like" gait. The joints are swollen, red and tender; pulse and respiration are quickened; and there is anorexia, coating of the tongue and sometimes nausea. During this stage an erythematous rash appears, not unlike that of scarlatina, though it may simulate that of rubeola or rubella. The face is reddened, the eyes swollen and painful and the conjunctiva injected. There is some enlargement of the cervical, suboccipital, axillary and inguinal glands. The urine is scanty and in rare cases may become albuminous. Prostration is great and there is consid-

erable mental depression and sometimes delirium. Rarely there are hemorrhages from the mucous surfaces; occasionally, jaundice. The initial fever lasts two or three days and terminates usually by crisis with profuse sweating and diarrhea, followed by complete remission of the symptoms, except that eruptions of various types appear upon the skin, such as erythema, urticaria, herpes or roseola; these are attended by intense itching and are followed by desquamation. The intermission lasts two or three days and is followed by a second paroxysm, usually less severe and of shorter duration than the first. This is followed by a second crisis and convalescence. Considerable gastric irritability and weakness is likely to remain. Occasionally the second paroxysm is omitted.

DIAGNOSIS.—The following table shows the difference between dengue and the diseases with which it is likely to be confused. Scarlatina and malaria are readily differentiated by a study of the symptoms.

DENGUE.	ACUTE RHEUMATISM.	INFLUENZA.	YELLOW FEVER.
An epidemic contagious disease; many affected.	Not contagious; few affected.	Likely to occur in epidemics; contagious; many affected.	Likely to occur in epidemics; contagious; many affected.
A disease of tropical or subtropical countries.	Most common in temperate climates.	Most common in temperate climates.	Most common in hot or tropical countries.
Most common in summer; checked by frost.	Most common in colder months.	Most common in colder months.	Most common in summer; checked by frost.
Catarrhal symptoms usually absent.	Catarrhal symptoms absent.	Catarrhal symptoms present and characteristic.	No catarrhal symptoms.
Severe pain in head, back, muscles and joints; joint tenderness and swelling moderate; not symmetric.	Pain in joints principal symptoms; much inflamed and very tender; symmetric involvement.	Pain in head, back and muscles; joint involvement usually absent.	Headache and pain in back; severe but not most prominent symptoms.

Dengue.	Acute Rheumatism.	Influenza.	Yellow Fever.
Nausea common; vomiting rare; diarrhea not uncommon.	Gastric symptoms not prominent.	Gastric symptoms not prominent.	Nausea and vomiting pronounced and characteristic; constipation.
Eruptions frequent and characteristic; jaundice rare.	Eruptions rare.	Eruptions rare.	Eruptions rare; jaundice common and often severe.
Hemorrhages rarely present and not severe; "black vomit" rare.	No hemorrhages.	No hemorrhages.	Hemorrhages common; "black vomit" common.
Pulse rapid and temperature high; distinct remission in the fever.	Pulse rapid and temperature high; no remission in fever course.	Pulse rapid and temperature high; no remission in fever course.	Pulse falls in rapidity while temperature, which is seldom very high, is increased; no distinct remission but a secondary stage of depression.
Very rarely albuminuria.	Rarely albuminuria.	No albuminuria.	Albuminuria almost constant.
Complications rare.	Cardiac complications.	Complications chiefly of respiratory organs.	Complications rare.
Mortality very low.	Mortality higher.	Mortality relatively high.	Mortality very great.

Prognosis.—The disease is rarely if ever fatal.

Treatment.—Treatment is addressed to the support of the patient's strength and the relief of the most distressing symptoms. Rest in bed is essential in all severe cases. The diet should be liquid, abundant in quantity and nutritious. Milk or the prepared milk foods are probably the best in most cases but may be supplemented by meat broths and gruels. If depression is great, alcoholic stimulants are permissible, or small doses of strychnin may be given. At the beginning of an attack a full dose of calomel (5 to 10 grains with soda) should be administered; if the stomach is very irritable a number of fre-

quently repeated small doses (¼ to 1 grain) will be found more effective. Nausea may be relieved by

Calomel .....gr. 3
Ipecac .....gr. 1
Bismuth subnitrate .....gr. 24

Make twelve powders. One every hour for several doses. Follow with a saline, as citrate of magnesia.

Very severe pain requires the hypodermic administration of morphin, but in ordinary cases one of the coal-tar drugs, such as phenacetin or acetanilid will be sufficiently effective and also acts as an antipyretic. Salol and the salicylate of sodium may also be tried in combination with these or alone. Codein is the best of the opiates for internal administration. The following combination may be used:

Codein sulph. .....gr. 3
Caffein citrate .....gr. 6
Acetanilid .....dr. ½
Salol .....dr. ½

Make twelve capsules. One every two to four hours for pain and fever.

High temperature is best relieved by cold sponging. Quinin is without value in this disease. The disagreeable itching of the skin may be alleviated by use of carbolated vaselin, zinc ointment and similar preparations.

During convalescence nutritious foods and tonics are indicated.

DIABETES INSIPIDUS.

Definition.—A disease of central nervous origin characterized by the passage of large quantities of urine containing neither sugar nor albumin.

Etiology.—Diabetes insipidus is a disease of adolescence and early adult life, occurring most frequently in males. It is often hereditary. It is excited by severe mental shock or excitement, by injuries, and by the ingestion of large quantities of fluids, especially beer. It occurs during convalescence from acute diseases, such as typhoid fever and influenza, as a complication of tuberculosis, syphilis, peritonitis, etc., and as a result of tumors of the cord. It is essentially a disease of the central nervous system. It is probably in many cases closely allied to

diabetes mellitus, occurring in patients of the "diabetic diathesis." Sometimes it may change into a saccharine diabetes.

PATHOLOGY.—No constant structural lesions have been found. The pressure of fluid in the pelvis of the kidney may produce distension of these organs and consequent local changes.

SYMPTOMS.—The characteristic symptom is the voiding of an immense amount of clear, almost colorless urine, of low specific gravity (1001 to 1005). The quantity passed in twenty-four hours may reach 10 to 20 quarts; the bladder is often emptied every half hour or hour during the day and a number of times during the night. There is no sugar and seldom a trace of albumin. The relative quantity of solids is greatly decreased but the entire amount passed during the twenty-four hours is slightly increased.

Thirst is usually very great. As a result of the constant loss of fluid the skin is dry and harsh and the amount of saliva diminished. The digestion is seldom greatly impaired, although there is likely to be constipation. The voracious appetite of diabetes mellitus is absent. There may be some loss of weight but the patient is usually well-nourished as compared with one suffering from diabetes mellitus. There are sometimes complicating nervous symptoms. Insomnia is quite common. It is usually caused by the necessity of frequent emptying of the bladder at night. Chorea may occur in children.

DIAGNOSIS.—An examination of the urine will readily differentiate the disease from interstitial nephritis and diabetes mellitus. There are no vascular changes. Hysterical polyuria is temporary in character and associated with the stigmata of that disease.

PROGNOSIS.—The disease may disappear spontaneously, or under treatment, but there is a strong tendency for it to remain permanently throughout life. It is not in itself fatal and is not inconsistent with a long life.

TREATMENT.—Of the drugs used in the treatment of this disease probably the most popular is valerian. Any of its preparations may be given but the most palatable is the elixir of the valerianate of ammonium, given in one or two dram doses three times a day. The bromids are frequently useful; a combination like the following may be tried:

Potassium bromid .....dr. 5
Elix. ammon. valerianate.....oz. 4
Teaspoonful in water three times a day.

Or the following tonic and sedative pill may be used:

Quinin valerianate .....gr. 1
Iron valerianate .....gr. 1
Zinc valerianate .....gr. 1
A pill like this to be taken three times a day.

Ergot is greatly praised by Da Costa and others; ½ to 1 dram of the fluid extract or 2 to 5 grains of ergotin may be taken by the patient three times a day. Gallic acid, in 20 grain doses, belladonna, antipyrin and acetanilid have their advocates. Opium and its preparations are less useful than in diabetes mellitus, and the danger of producing the opium habit must always be kept in mind. Pavy recommends:

Codein .....gr. 8
Glycerin .....oz. 1
Water .....oz. 1
Half a teaspoonful three times a day, gradually increased to two teaspoonfuls.

Tonic treatment with iron, quinin, strychnin, etc., is of distinct value.

The habits of the patient should receive careful supervision. Excesses of all kinds should be forbidden. Malt liquors are best cut off and the amount of fluid reduced as much as consistent with the patient's comfort. Sufficient out-door air and exercise and a nutritious diet are to be recommended.

DIABETES MELLITUS.

DEFINITION.—A nutritional disease characterized by the excretion of a large quantity of urine containing sugar.

ETIOLOGY.—Diabetes may occur at any age but is most common in late adult life and more frequent in males and among the well-to-do element. Jews are especially susceptible to the disease and negroes are generally exempt. High-living and the excessive use of carbohydrates as food are supposed to be factors in its production. Physical or mental overwork, nervous excitement, obesity, injuries to the head or cord, pregnancy and certain diseases, such as gout, syphilis, epilepsy, enteric fever, influenza and malaria, have a causative relation to the disease. The

influence of heredity has been occasionally noticed. The disease is less common in this country than in Europe.

The underlying causes of the disease are not yet fully understood but in general it may be said that diabetes is due to disease of the liver or pancreas or impairment of the function of one of these organs as a result of central nervous disturbance. Hepatic diabetes is produced in one of two ways; either by an overproduction of sugar by the liver, or by a defect in its carbohydrate stopping power. Pancreatic diabetes is now known to be very common. Its nature is still obscure but it is generally explained that the organ secretes a glycolytic ferment necessary for the metabolism of sugar; in the absence of this ferment sugar accumulates in the blood with a consequent glycosuria. Later experiments, however, seem to show that the pancreas secretes a substance which neutralizes some other substance entering the body during digestion and capable of producing an overproduction of sugar.

Pavy explains the disease by the hypothesis that the carbohydrate-stopping and fat-converting power resides both in the intestinal villi and the liver. If either becomes seriously impaired the carbohydrate excess passes over into the blood and glycosuria follows. These theories are still inconclusive.

PATHOLOGY.—Pathological changes are found in the pancreas in a large number of cases. Interstitial inflammation, atrophy, cystic degeneration, cancer and abscess have been noticed. The liver is often enlarged and the seat of hypertrophic cirrhosis and fatty degeneration; bronzing of the skin is an associated symptom. The kidneys may also undergo degenerative changes produced by the increased work. The lungs may show a number of complicating conditions, including congestion, bronchopneumonia, gangrene, and tuberculosis. The heart is often hypertrophied, pale and flabby and gives evidence of fatty degeneration. Tumors and pathological changes of the brain, medulla and cord are found but are not constant or characteristic. The blood contains a larger proportion of sugar than in health. The pathological findings are so slight as to throw no light upon the etiology of the disease.

SYMPTOMS.—The symptoms of diabetes usually appear gradually and the patient may not be aware that he has any disease

until he is examined for life insurance. The first symptom which he is likely to note is the passage of urine in increased quantity and with unusual frequency. With this there will be marked thirst, a sense of weakness or debility and probably some loss of weight. Other early symptoms are digestive disorders, headache, irritability and insomnia.

Urinary Symptoms.—The urine is strongly acid, pale in color, has a sweetish odor, is greatly increased in quantity (perhaps to 150 or 200 ounces) and has a high specific gravity (1025 to 1050). Glucose is present in varying quantity. In mild cases the urine contains from ½ to 2 per cent; in severe cases from 2 to 10 per cent. The total amount excreted in twenty-four hours may reach a pound. Other forms of sugar sometimes present in the urine are inosite and levulose. Fermentation products are alcohol, peptones, diacetic acid and acetone. A large amount of acetone is characteristic of severe forms of the disease and its presence is a bad prognostic sign. The quantity of urea is increased; this is probably due in part at least to the larger percentage of proteid food. Upon standing diabetic urine becomes turbid but does not undergo ammoniacal decomposition. Saccharine fermentation follows exposure to the air. In many cases albumin will also be found in the urine. This results from secondary degenerative changes in the kidneys.

Digestive Symptoms.—One of the most noticeable symptoms of diabetes is the excessive thirst. Usually the amount of fluid ingested is directly proportionate to the amount excreted. The thirst is greatest an hour or two after meals, when sugar production is most active. The appetite is fitful but during the early stages of the disease is generally ravenous. The craving for sweets is frequently very great and at times becomes almost uncontrollable. Considering the large amount of food taken the digestion is usually very good. Constipation is usually present. Fatty stools are suggestive of pancreatic diabetes. Later in the disease the appetite may fail and gastro-intestinal catarrh is likely to supervene. J. M. Allen calls attention to the common occurrence of duodenal inflammation and considers it an etiological factor in the production of the disease. The tongue is generally red, dry, fissured and sticky, the gums swollen, the teeth decayed, and the saliva decreased in quantity and acid in

reaction. There is a characteristic sweetish odor to the breath.

Constitutional and Nutritional Symptoms.—As a consequence of the great drain of fluid there is a continuous decrease in weight, in spite of the enormous quantity of food which is eaten. This symptom is most marked and most rapid in children. At the same time there is progressive debility and muscular weakness, and loss of sexual desire. There is a tendency to cramps in the legs, which generally appear in the night or early morning. The temperature often becomes subnormal as a result of decreased carbohydrate consumption. The pulse is at first normal or slow but later becomes feeble,—sometimes decreased and sometimes increased in frequency; unusual rapidity may indicate approaching coma. Arteriosclerosis is common. Pulmonary tuberculosis, gangrene of the lung and pneumonia are not infrequent complications.

Cutaneous Symptoms.—The skin of the diabetic is dry and harsh, the hair loses its lustre and falls out and the nails become brittle and hard. Pruritus of the genital region is very common, especially in females. When this symptom is present an examination of the urine should always be made. It is due to the irritant character of the urinary discharge. Eczema is sometimes an annoying symptom in the same region. Boils and carbuncles are very prone to appear in diabetes. Gangrene is one of the most serious complications and may affect an extremity. It is due to the associated arteriosclerosis.

Mental and Nervous Symptoms.—Among these are various neuralgic affections, neuritis, diabetic tabes, and sciatica. Other symptoms are headache, irritability of temper, insomnia and depression of spirits. The organs of special sense are often affected. Cataract is a common complication and retinitis and atrophy of the optic nerve may be caused by an associated neuritis. Deafness sometimes occurs.

Diabetic coma is the terminal symptom of half the cases of the disease. An attack is excited by exhaustion, excitement and the complicating disorders. It may come on gradually, with headache, increasing drowsiness and other signs of autointoxication, and with decreased excretion of urine, lessened glycosuria and decided increase in the acetonuria; or it may appear suddenly, preceded by delirium or maniacal excitement, the

patient passing rapidly into unconsciousness. The rate of respiration is increased to 30 or 40 per minute and there is both inspiratory and expiratory dyspnea: this is characteristic. The pulse rate is 130 to 150 per minute. The face is pale, the temperature at first subnormal, but toward the end there may be fever (103° to 105° F.). The urine is diminished and sometimes suppressed: constipation is the rule. Just preceding death there are often convulsions and cyanosis. Some authorities believe that the coma is excited by betaoxybutyric acid, which is split up into acetone and diacetic acid. Certainly an increase of acetone is significant of this condition and frequent urinary examinations should be made to determine its presence. Uremia is undoubtedly really responsible for many cases.

DIAGNOSIS.—The character of the disease is readily determined by an examination of the urine. This should never be omitted in suspicious cases.

PROGNOSIS.—In children the disease is likely to run an acute course and terminate fatally within a few weeks. Cases occurring after middle life present the best prospects of recovery. Obesity is a favorable condition, while rapid emaciation points to a quick termination. Complications, such as tuberculosis, pneumonia, gangrene and coma, greatly increase the gravity of the prognosis, and cases occurring after injury are very fatal.

TREATMENT.—*Dietetic.*—This is the most important part of the treatment and consists of an arrangement of the diet that will cut down the amount of the carbohydrate food—sugars and starches. It is, however, a mistake to make unvarying dietetic rules. It is much wiser to take into consideration the physical condition of the patient and to regulate the diet as far as possible in accordance with his personal idiosyncrasies,—to adjust it to suit the acuteness and severity of the case and modify it as demanded by intercurrent affections, such as gastro-intestinal disturbances or nephritis. As a rule, the well-nourished and obese do better on a rigid dietary than do the emaciated and debilitated. In the latter cases diet must be more generous and nourishing.

The carbohydrates are producers of heat and energy. In withdrawing them it is wise to use as a partial substitute a larger quantity of fats, which perform a similar office. This is

well-stated editorially in a recent number of the Medical News (Feb. 17, 1900): "In modern life there has been a departure from old habits in the use of fats in diet and a substitution of the starchy carbohydrates that is the source of a good many inconveniencies. A certain distaste for fats is acquired by many people and an important article of food neglected. Diabetics must first of all be taught to use fats in abundance. They are the only substances that can succeed in stilling the craving for the starches and sugars and can properly replace them." The main dependence must, however, be placed upon animal foods. Meats of all kinds (except liver, which is rich in sugar), fish, eggs, milk, cheese and butter are the staple articles of diet. To give variety the acid fruits and certain non-carbohydrate vegetables may be added, such as spinach, lettuce, onions, radishes, cucumbers, tomatoes and cabbage.

It is necessary, in all cases, to allow a certain amount of carbohydrate food. Either bread, usually toasted, or potatoes are generally permitted in carefully regulated quantity. The former is rich in starch, containing about 60 per cent; it is, therefore, important that the quantity should be limited. Potatoes contain a much smaller percentage, only 15 per cent, according to Saundby, who finds that as a rule they are better tolerated than bread, while the much greater bulk presents undoubted advantages. Six ounces of potato is enough for one meal. Bread and potato should not both be eaten at the same time.

The most rational way of determining the permissible quantity of carbohydrate is given by van Noorden. The patient is put for one day upon a "standard" diet, consisting of, for instance, 100 grams of wheat bread with the usual albuminous and other allowance. During this day the urine is collected and the amount of sugar estimated. If sugar is absent after a few days the amount of carbohydrate is increased and a second examination made. This is continued until it is learned just how much carbohydrate food can be assimilated and the daily allowance placed slightly below this. In case the "standard" diet causes a considerable quantity of sugar to appear in the urine the carbohydrate is gradually decreased for a few days and the urine examined. This is continued until the greatest degree of tolerance is reached. Occasional periods of entire

abstinence from sugars and starches increase the assimilating power. Three or four days each month are usually sufficient for this purpose. Diabetic and similar breads are of little special value. As a rule the patient will do best upon the bread to which he is accustomed. Kraus recommends that the carbohydrates be given at the largest meal; they should be avoided at breakfast.

Alcoholic drinks are best omitted from the diet list but occasionally must be permitted when the patient is accustomed to their use. Claret and other sour wines, bitter ale (which is free from sugar), Scotch whiskey and brandy are most suitable. H. Stern has recently shown that the excessive use of tobacco greatly increases the urinary output of sugar. The tobacco should be stopped or its quantity reduced to a minimum.

The following table will give an idea of the various kinds of food which are to be allowed or forbidden:

Foods Permitted.	Foods Forbidden.
Soups.—All kinds of clear meat soups made without vegetables.	*Animal Food.*—Livers of all animals; molluscs (oysters, clams, etc.).
Animal Food.—All kinds of fish except molluscs. All kinds of meat, poultry and game,—fat and lean; eggs, milk, cream, butter and cheese. Salted meats and fish may be used unless they produce too much thirst.	*Sugar.*—All forms, including syrup, molasses, honey, confectionery, jams, preserves and all articles containing sugar.
Fats.—All kinds, animal or vegetable; included under this head are olive oil, salads made of oil, butter and cream.	*Cereals.*—All kinds, including rice, tapioca, sago, macaroni, spaghetti, vermicelli, Indian meal, buckwheat, oatmeal, barley; all pastries, cakes, puddings and pies; everything made of flour except the bread specifically allowed.
Vegetables.—Spinach, lettuce, radishes, cucumbers and pickles (sour), mushrooms, cranberries, horseradish, cress, celery, sauerkraut, string-beans, summer squash, onions, asparagus, tomatoes, egg-plant and cabbage are generally allowable.	*Vegetables.*—Potatoes, except when specifically allowed; peas, beans, parsnips, turnips, beets, carrots, rhubarb, parsnips, squashes (winter), corn, cauliflower and broccoli.

Foods Permitted.	Foods Forbidden.
Fruits.—Lemons, gooseberries, currants, sour apples and other acid fruits.	*Fruits.*—All sweet fruits, including figs, peaches, apricots, bananas, dates, prunes, plums, pears and sweet apples. Melons and berries are sometimes allowed.
Nuts.—All except chestnuts.	*Nuts.*—Chestnuts.
Beverages.—Tea and coffee, sweetened with saccharin; buttermilk, milk, alkaline mineral waters; bitter ale and sour wines.	*Beverages.*—Sweet wines; beer and other malt drinks, except bitter ale; liquors.

Hygienic.—The patient should live, if possible, in a warm equable climate, should wear flannel next to the skin and avoid exposure to the cold. Fatigue, either mental or physical, should be avoided but moderate exercise is of decided value and undoubtedly decreases the glycosuria. Hydrotherapy is a valuable aid to treatment. Daily warm baths may be taken by the debilitated and the cool sponge bath with friction by the more robust. Massage is useful. A course of the alkaline mineral waters is often of great benefit. Special attention should be given to the care of the teeth.

Medicinal.—The two most valuable drugs in the treatment of diabetes are arsenic and opium. Arsenic is very valuable in many cases but it must be given over a long period of time and the dose increased up to the point of tolerance. Fowler's or Pearson's solutions may be given or the solution of the bromid of arsenic, 3 to 5 minims of any of these, three times a day, increasing the dose one drop a day until puffiness of the lids or nausea appears, after which the dose is slightly decreased and the drug continued. Similar in effect and given in the same way is "arsenauro," or the Solution of the Bromid of Gold and Arsenic, N. F.

The opiates have an established reputation in diabetes, for which they are generally esteemed the most valuable remedies. It is best, however, to withhold them until it is shown that dietetic and other treatment is not effective, since they have some very decided disadvantages. There is always danger of the opium habit (though less than in other diseases); once com-

menced they must usually be continued; and they often disarrange the digestive apparatus. The initial dose of powdered opium is 1 grain, three times a day, gradually increased; of morphin, $\frac{1}{8}$ grain, increased to 1 grain or more, three times a day; of codein, $\frac{1}{4}$ grain, increased to 2 or 3 grains three times a day. The last named drug is the most popular and attended with less disagreeable symptoms, although some clinicians consider it less effective than morphin.

Where there is any indication of intestinal toxemia, and this is by no means rare, excellent results are obtained by addressing the treatment to this tract. Cleaning out the bowels with small repeated doses of calomel, a morning laxative dose of sodium phosphate and the use of intestinal antiseptics, such as guaiacol (5 minims), guaiacol carbonate (5 to 10 grains), benzonaphthol (5 grains), or sulphocarbolate of sodium (5 to 10 grains), three or four times daily, give good results. J. M. Allen believes that the duodenum is often at fault, and in such cases prescribes food that is digested largely in the stomach and gives intestinal antiseptics and tonics, as strychnin or nux vomica. Strychnin ($^1/_{30}$ grain three times a day) may be given with advantage in nearly all cases.

Among other drugs which are recommended and have been used with varying degrees of success are antipyrin (10 grains three times a day), and sodium salicylate (15 grains three times a day). These undoubtedly diminish the amount of sugar but are depressing. The same may be said of potassium bromid (20 grains three times a day). In cases of gouty or rheumatic diabetes Hare recommends potassium iodid, colchicum and the salicylates, and as an adjuvant lithium carbonate or citrate. Jambul (5 to 30 grains once to three times daily and increased) has been used with widely varying results, but on the whole is unsatisfactory. When the acidity of the blood is high, and especially if there is much acetone, or if there is diacetic or oxybutyric acid in the urine, the possibility of coma should be considered and alkalies given in large quantities, such as sodium bicarbonate or potassium citrate (20 to 30 grains of either every hour).

Diabetic coma is generally fatal. A quickly acting cathartic like magnesium sulphate should be given as soon as symptoms

of this condition appear, the colon should be washed out from below and hypodermoclysis with hot normal salt solution tried. Believing the coma due to acid intoxication, clinicians usually add to the fluid for injection a quantity of sodium bicarbonate, hoping thereby to alkalinize the blood, but the results are almost uniformly disappointing. Alkalies may also be given (potassium citrate, 30 grains hourly) by the mouth and Vichy and milk for alimentation. To support the heart hypodermics of strychnin, digitalis and ether may be administered, and if there is a hard, full pulse, nitroglycerin.

DIARRHEA AND DYSENTERY.

DEFINITION.—Unusual frequency in the evacuation of the bowels.

VARIETIES.—Diarrhea may be produced by many drugs, by intestinal irritants or occur as a symptom of various acute and chronic diseases. The ordinary clinical forms may be classified for convenience as follows: 1. Simple Diarrhea, in which there are no morbid anatomical changes, embracing (a) nervous diarrhea, (b) dyspeptic diarrhea, (c) stercoral diarrhea. 2. Intestinal Catarrh, which may be (a) acute or (b) chronic. 3. Infantile Diarrhea, including (a) acute dyspeptic diarrhea, (b) enterocolitis, and (c) cholera infantum (which see). 4. Dysentery, including (a) the catarrhal, (b) the amebic, and (c) the diphtheritic forms.

SIMPLE DIARRHEA.

ETIOLOGY.—This is essentially a motor neurosis in which the frequency of movements is caused by increased intestinal peristalsis with a rapid transudation of watery secretions into the bowel.

Nervous diarrhea occurs in neurotic individuals as a result of psychic causes, such as excitement, fear, fatigue, shock or nervous exhaustion. It may be excited reflexly, as by gastric disturbances or dentition; it occurs as a symptom in tabes. The diarrhea following exposure to cold is of a similar character, the chilling of the abdominal walls causing reflexly a hyperemia of the intestinal vessels and increased secretion and peristalsis.

Dyspeptic diarrhea is due to overloading the stomach or to unsuitable food. Fresh or unripe fruits or vegetables and decomposing articles of diet are likely to excite diarrhea. Gastric dyspepsia acts as a cause; subacidity more frequently than hyperacidity, probably on account of the likelihood of fermentative changes and greater consequent local irritation.

Stercoral diarrhea usually alternates with constipation; peristalsis is set up by the evolution of irritating gases from the decomposing feces. Hard scybalæ probably exert an irritant local influence upon the mucous membrane.

SYMPTOMS.—In nervous diarrhea the bowel movements are considerably increased in frequency and are much more numerous in the morning soon after arising. The stools are usually fluid in character and free from such evidences of inflammatory disease as mucus, pus, blood, etc. There are frequently other nervous phenomena, including vertigo, palpitation of the heart, a sense of oppression, and flashes of heat and cold. The diarrhea often follows the nervous shock or excitement to which it is directly referred.

In dyspeptic diarrhea there are a number of passages of fecal matter, perhaps containing partially digested food. As soon as the offending matter is removed the diarrhea is naturally checked.

In stercoral diarrhea after a period of constipation the abdomen becomes distended with gas, foul smelling flatus is passed and there are coated tongue, headache and other evidences of intestinal toxemia. The passages are at first formed and contain hardened lumps of feces; later they become mushy and loose.

PROGNOSIS.—Usually good. If the disease persists for a long time an enteritis may be produced. Stercoral diarrhea is peculiarly prone to terminate in intestinal catarrh.

TREATMENT.—In nervous diarrhea it is of first importance to improve the patient's health and increase the nervous tone. Rest, a generous but simple diet, gentle exercise, massage, hydrotherapy and tonics are useful. Arsenic in increasing doses, strychnin, the hypophosphites and iron may be prescribed. Sometimes the bromids are useful to allay irritability of the nervous system. Einhorn advises that patients subject to nervous diarrhea be educated to resist the desire for stool and taught to

cultivate the habit of a single morning evacuation. Any of the simple diarrhea mixtures given below may be prescribed when the passages are so frequent as to be troublesome.

Dyspeptic and stercoral diarrheas, when seen early, are benefited by giving quickly acting laxatives, such as castor oil (½ to 1 ounce) or magnesium sulphate (½ ounce) in order to sweep out of the bowel all irritant matter. Rhubarb is a good laxative in dyspeptic diarrhea, and may be combined with antifermentatives and astringents. An enema helps to soften impacted and hardened feces.

Opium is the most valuable remedy to check peristalsis and diminish the flow of intestinal fluid; the addition of astringents increases its efficiency. Among those of most value are bismuth subnitrate and salicylate (10 to 30 grains of either), the tannic acid preparations, tannigen (10 to 15 grains), tannopin (10 to 15 grains) and tannalbin (15 to 30 grains), such vegetable astringents as kino, catechu, hematoxylon, etc., and aromatic sulphuric acid. Below are a few useful prescriptions:

Dover's powder .....gr. 20
Tannigen .....dr. 2
Bismuth subnitrate .....dr. 1
Aromatic powder, enough to make.....dr. 4
Make 12 powders. One every two to four hours as required.

Aromatic sulphuric acid .....dr. 2
Spts. chloroform .....dr. 1
Paregoric .....oz. ½
Syrup ginger, enough to make.....oz. 2
Teaspoonful every two or three hours.

Morphin sulphate .....gr. 2
Spts. peppermint .....dr. ½
Spts. camphor .....m. 15
Sodium bicarbonate .....gr. 15
Alcohol .....oz. ½
Syrup, enough to make.....oz. 4
Teaspoonful every two or three hours for diarrhea. Shake before using. This formula we can especially recommend.

Ext. opium .....gr. 3—6
Tannigen .....dr. 1
Make 12 capsules. One every two to four hours.

For the colicky pain a hot water bag or a mustard draft placed upon the abdomen will be found useful.

INTESTINAL CATARRH; ENTERITIS; ACUTE OR CHRONIC DIARRHEA.

ETIOLOGY.—Acute intestinal catarrh may occur at any age, but is most common in children. The causes include (1) overeating or drinking; (2) indigestible food, unripe food, tainted or decomposing milk, meat or fish, cold drinks, impure water and stale beer; (3) purgative, drastic and irritating drugs; (4) the presence of toxic products, as ptomains, either elaborated within the intestines or brought there from other portions of the body as in the case of diarrheas following extensive burns; (5) mechanical irritants, as hardened feces, enteroliths, calculi, foreign substances which have been swallowed, intestinal worms or parasites; (6) bacteria, and especially the colon bacilli, which become active when from any cause the resistance is reduced; (7) debilitating diseases, such as chronic malaria, phthisis, nephritis, severe anemia, or carcinoma; (8) pelvic congestion caused by heart or liver disease or neighboring inflammation.

PATHOLOGY.—The morbid changes are those of a catarrhal inflammation elsewhere. There is redness and swelling, followed by a free mucus discharge. The process is more active in the neighborhood of the solitary and agminated glands. In severe cases there may be excoriation of the mucous membrane with small focal hemorrhages and occasionally ulceration.

In chronic cases there is usually infiltration and thickening of the intestinal walls, though rarely there may be atrophy and thinning. Necrotic changes are more marked and ulceration is common.

Catarrhal enteritis may attack any portion of the gut from the duodenum to the rectum, or the whole intestinal mucosa may be affected. Colitis is, however, most common. Gastric catarrh is a frequent complication.

SYMPTOMS.—The attack is likely to come on in the night. The most characteristic symptoms are the colicky or griping pain and the diarrhea. The pain is paroxysmal, is relieved by pressure, heat and emptying of the bowel. In most cases it is followed by diarrhea, the stools varying in quantity from three or four to twenty or more in the twenty-four hours. The first movements consist of formed fecal matter, but they soon become thin, watery, frothy, acid in reaction and extremely

irritating, causing tenderness and excoriation at the anus. In color they are yellowish to yellowish-brown and are found upon careful microscopical examination to contain mucus, epithelium, numerous microorganisms, biliary substances shown by the Gmelin test, and fragments of unchanged food. If ulceration is present there is pus and blood.

Often, to the pain, discomfort and a sense of weakness, there is added nausea and vomiting, which is due to concurrent gastric catarrh. The accumulation of gas and the active peristalsis cause rumbling of the bowels (borborygmi). There is rarely any elevation of the temperature.

Physical Signs.—[illegible]

Progress of the Disease.—[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

kidneys. There is usually a sense of discomfort and slight colicky pains in the abdomen, coming on three or four hours after eating, and often tenderness upon pressure. If the colon is affected Einhorn notes that this tenderness is referred to a point in the colon just beneath (toward the rectal end) or a little remote from the point of impact. If the abdominal walls are thin, fecal masses or fluids can be felt by the examining fingers. Usually there is diarrhea, but if the upper portion of the bowel is affected this may be absent. Sometimes there is constipation; sometimes diarrhea and constipation alternate at longer or shorter intervals. In some cases the feces accumulate during the night and there are a number of loose movements upon arising. A troublesome and characteristic symptom is the accumulation of gas, causing rumbling sounds in the bowel (borborygmi) and the almost constant and embarrassing desire to pass flatus. If the small intestine is affected there is likely to be belching from the stomach. The evacuation of this accumulated gas relieves the sense of oppression.

Most valuable information is derived from an examination of the feces. If the affection is in the small intestines they are often formed and not abnormal in appearance, but the percentage of undigested food is large. If low down, the diarrhea is most pronounced and the discharges are thin, yellowish or brownish and often offensive. The presence of mucus is an important diagnostic sign of catarrhal inflammation. Fermentation is shown by tympanites and the passage of gas and is further shown by the presence of indican in the urine. Pus and blood in the feces show ulceration. A microscopic examination helps to clear up the diagnosis.

As the result of the disease there is a general nutritive disturbance, loss of weight, weakness, irritability of temper and melancholy. Headaches, nausea, loss of appetite and a red fissured tongue are other digestive disturbances. When there is atrophy of the mucous membrane the food is not properly absorbed and there is great emaciation and anemia.

Diagnosis.—Usually this is easy, the effort being naturally directed toward localization. The history of the case, the character of the discharges (especially the presence of mucus) and the constitutional symptoms will eliminate nervous diarrhea.

Typhoid fever has a characteristic temperature curve and gives the Widal reaction.

PROGNOSIS.—Favorable. Mild cases recover in two to five days and severe ones are seldom protracted more than two or three weeks. In young children the danger is much increased. The possibility of the establishment of a chronic process should be kept in mind. This is a very tedious affection which often resists treatment.

TREATMENT.—*Acute Enteritis.*—Rest in bed is important in all cases of catarrhal enteritis and essential in severe cases. For the first twenty-four hours it is a good plan to withhold all food. This is especially important in children. Following this, liquid foods only should be given until the acuteness of the symptoms has subsided. Boiled or pancreatized milk, milk and lime water, malted milk, milkene, meat juices, meat soups, albumin water, and thin gruels are allowable. Most young children and many adults do best without milk. Liquid peptonoids, alone or with creosote, makes an excellent liquid aliment.

The irritating matter in the bowels should be thoroughly evacuated by a proper laxative, as one-half ounce to an ounce of castor oil or magnesium sulphate. If infection is present, as shown by marked elevation of temperature, a full dose of calomel (10 grains) may be given. If there is nausea or vomiting small doses of calomel will often settle the stomach and also act upon the bowels, as in the following triturate:

Calomel ..... gr. $^1/_5$
Ipecac ..... gr. $^1/_{10}$
Sodium bicarbonate ..... gr. 1

A tablet to be taken every half-hour or hour, for several doses, followed by citrate of magnesia, a Seidlitz powder or Rochelle salts.

Rhubarb is good for children and has a salutary after-astringent effect. Bruce recommends:

Powd. rhubarb ..... gr. 1—3
Sodium bicarbonate ..... gr. 2
Mercury with chalk ..... gr. ½—1
Powd. ginger ..... gr. ½

The mercurials are required in case of hepatic complication, either in the form of calomel or blue pill.

Many cases need no further treatment, but usually other

symptoms require attention. The pain, if severe, may be relieved by 10 to 20 drop doses of chlorodyne (see Cholera Morbus for formula), or a hypodermic of morphin (½ to ¼ grain). A large mustard poultice or a hot-water bag on the abdomen helps to relieve the pain.

Opium and astringents are given to check the frequency of the passages, but only after the bowels are well emptied. If the case is seen late and there has been considerable purging, the preliminary laxative may be omitted, provided the stools are thin, odorless and free from fecal matter. Astringents are combined with opium to relieve the pain and decrease the peristalsis; with alkalies, to neutralize the acidity of the fermenting intestinal contents; and with antiseptics to prevent the multiplication of intestinal bacteria. Among the most important remedies are opium and its alkaloids; bismuth subnitrate, salicylate and subgallate; kino, catechu and hematoxylon; sodium bicarbonate, limewater, magnesia and chalk; salol, creosote, thymol, eucalyptol, camphor, naphthalin, acetate of lead, etc. These may be variously combined, as in the following:

Squibb's diarrhea mixture, which contains:—

Chloroform	dr. 1
Tinct. capsicum	dr. 3
Tinct. opium	dr. 3
Spts. camphor	dr. 3
Alcohol, enough to make	oz. 2

Teaspoonful in water as needed.

Powd. opium	gr. 1
Lead acetate	gr. 1

One pill, to be repeated every three or four hours as necessary.

Paregoric	dr. 1
Salol	dr. ½
Comp. tinct. catechu	oz. 1
Chalk mixture, enough to make	oz. 2

Two teaspoonfuls every two to four hours.

Bismuth in large doses (20 to 60 grains) is an extremely useful remedy in cases which show a tendency to linger. It has a sedative effect upon the inflamed mucosa and is mildly antiseptic and astringent. It may be variously combined or given alone.

Morphin sulph. .....gr. ½—1
Tannigen .....dr. 1
Bismuth subnit. .....dr. 2
Spts. peppermint.....a sufficient quantity.
Make 12 powders. One every two to four hours.

Codein .....gr. 3
Benzonaphthol .....dr. 1½
Bismuth subnitrate .....dr. 2
Make 12 powders. One every two to four hours.

Bismuth subnitrate .....dr. 4
Salol .....dr. 1
Paregoric .....dr. 3
Tinct. ginger .....dr. 3
Chalk mixture, enough to make.....oz. 3
Two tablespoonfuls every three hours until the stools are formed, then one teaspoonful three times a day.—Herwisch.

Dover's powder .....gr. 12
Thymol .....gr. 1½
Eucalyptol .....gr. 3
Beta-naphthol .....dr. 1
Bismuth subnitrate .....dr. 2
Make 12 powders. One every two or three hours.

Anders recommends as a useful intestinal antiseptic the following:

Salol .....gr. 30
Creosote .....m. 10
Bismuth salicylate .....dr. 1
Make 20 capsules. One every three hours.

Rhubarb .....gr. 24
Salol .....gr. 24
Sodium bicarbonate .....dr. 2
Bismuth subnitrate .....dr. 2
Spts. peppermint.....a sufficient quantity.
Milk sugar .....dr. 1
Make 12 powders. One every two or three hours.

Tinct. opium .....dr. 2
Tinct. rhubarb .....dr. 2
Oil sassafras .....gtt. 2
Comp. tinct. catechu .....dr. 4
Comp. tinct. lavender, enough to make....oz. 2
Teaspoonful every three hours.—Loomis.

Paregoric	dr.	4
Spts. peppermint	dr.	½
Listerine	dr.	3
Syr. ginger	oz.	½
Brandy, enough to make	oz.	4

Dessertspoonful every two or three hours.

Where the large intestine is principally affected, local applications are often of the most value. Simple irrigation with hot water, boric acid solution (½ dram to the pint) or normal salt solution (.6 per cent), at a temperature of 110° to 120° F., aids in bringing about resolution. Or more active antiseptics and astringents may be used, such as creolin (10 to 30 grains to the pint), permanganate of potassium (1 to 5 grains to the pint), tannic acid (½ to 1 dram to the pint) or nitrate of silver (¼ grain to the ounce). If the last remedy causes pain 20 to 30 drops of tincture of opium may be added to the solution, which should be retained for ten or fifteen minutes. The fluid is to be introduced, one to four times daily, from a fountain syringe through a soft rubber rectal tube. Of the more astringent preparations, a pint to a quart may be introduced each time; the simple irrigants are allowed to flow in and out in greater quantity. If there is much tenesmus twenty to thirty drops of laudanum in two ounces of warm starch water may be injected with a hard rubber syringe.

Treatment of Chronic Enteritis—Hygienic and Dietetic.—Cases of chronic enteritis are often associated with intestinal indigestion. Severe cases require a carefully regulated diet. Fats and starches, which are largely digested in the intestine, should be excluded as far as possible, and articles selected which are digested by the stomach. For a few weeks many cases do best upon a milk diet; the milk may be pancreatinised, skimmed or diluted with limewater. Rare, lean meat and stale bread are other foods which may be used, and eggs, oysters, koumiss, rice, meat soups, bouillon, etc., may be added to the dietary as needed. Sometimes scraped raw beef, beef meal or beef peptonoids will be digested best. In mild cases with constipation, cold water, buttermilk, fresh fruits, such as apples, pears and oranges, or the more digestible vegetables, such as green peas, cauliflower, etc., may be given to stimulate peristalsis. Coarse foods or those which produce a large amount of residue should not be eaten;

they serve to irritate the mucosa and increase the diarrhea. The simple diet of milk, raw or rare, finely chopped or scraped beef and dry or toasted bread is most suitable in the severe cases, whether there is constipation or diarrhea, and should not be hastily changed for a mixed diet with beginning improvement.

These patients should be warmly clothed, should wear flannel next the skin, and the abdominal binder. Residence in a warm, equable climate is desirable where possible. Out-door exercise and sunlight are good remedies. Massage helps to improve nutrition and correct constipation if present. Daily warm baths, or better still, cold sponge or shower baths followed by friction are serviceable. The mineral waters of Carlsbad, Kissengen, Marienbad and Saratoga are sometimes used with great benefit.

Medical treatment is usually commenced with a dose of magnesium sulphate (½ ounce) or several repeated doses of calomel (¼ to 1 grain). If diet is not sufficient to regulate the bowels, rhubarb, cascara sagrada, an aloin, strychnin and belladonna pill, or an occasional enema may be needed. Pancreatin aids in intestinal digestion when this is poor, as:

Pancreatin .....dr. 1
Sodium bicarbonate .....dr. 2
Make 12 powders. One an hour after meals.

To prevent putrefactive changes, beta- or benzonaphthol (5 grains), salol (5 grains), creosote (2 to 5 drops), or bismuth salicylate, subgallate or subnitrate (15 to 30 grains) are prescribed, often with astringents to arrest the diarrhea, which is generally the symptom most in evidence. Tannalbin and tannigen are valuable.

Tannigen .....dr. 1
Benzonaphthol .....dr. 1
Bismuth subnitrate .....dr. 1
Make 12 powders. One three or four times daily.

Opium should be avoided as far as possible, but it is sometimes apparently necessary to use it in some form. Codein usually answers every purpose and is less likely to disarrange digestion. Nitrate of silver, ¼ grain in a pill to be taken three times a day, is given by many clinicians. It should be taken before meals, followed by one-half a glass of water.

The local treatment is of special importance in chronic diar-

rhea affecting the lower bowel. The irrigants recommended for the acute disease may all be used here, but sometimes in greater strength. The nitrate of silver is especially beneficial.

INFANTILE DIARRHEA.

ETIOLOGY.—Infantile diarrheas occur in children between six months and two years of age. They are more common in cities, and among unhygienic surroundings. Malnutrition, teething and exposure to sudden changes of temperature are predisposing causes, but the primary causes are high temperature and improper food. During the summer months decomposition of food products is rapid and the influence of the summer heat is to depress the sensitive nervous system of the child. Milk, which is the principal food of hand-fed infants, undergoes putrefactive changes which make its use dangerous unless the most scrupulous care has been taken in its distribution, preservation and preparation. Unclean milk cans and nursing bottles and the long rubber tube are responsible for a large infant mortality. Nearly all cases of summer complaint in children are milk toxemias, though indiscriminate feeding of children upon articles suitable only for adults cause many cases of infantile diarrhea.

Entero-colitis follows the ordinary acute dyspeptic diarrhea or cholera infantum, but may be primary, or complicate the acute infections of childhood.

PATHOLOGY.—Acute dyspeptic diarrhea presents no morbid changes in the bowel aside from a slight hyperemia. In entero-colitis there is a catarrhal inflammation of the mucous membrane most intense about the glandular structures. There may be erosions and ulceration, with hemorrhage and pus formation.

SYMPTOMS.—*Acute dyspeptic diarrhea* is usually caused by overloading the stomach or by improper food. The diarrhea is the prominent symptom. This may come on gradually with fretfulness and loss of appetite, but with little constitutional disturbance, or it may appear suddenly, perhaps ushered in with convulsions, followed by high temperature (104° to 105° F.), vomiting and severe colicky pain, shown by flexing the limbs upon the abdomen. The stools may exceed twenty in the twenty-four hours and usually contain casein or fragments of undigested

food and are gray to yellow in color, becoming green upon exposure to the air, and are either acid or very offensive to the smell. This is determined by the character of the food. Saccharine and starchy substances are likely to undergo fermentative changes and become sour, while the proteids, of which the casein of milk is the common form, undergo putrefactive changes. Mild cases terminate in recovery in a few days; severe ones may result in entero-colitis.

In *entero-colitis* the early symptoms are much the same, but the fever is higher, vomiting is less common, the pain is generally more severe, and if the lower bowel is affected there is a very marked tenesmus. The discharges are at first feculent and greenish, but soon become small in quantity, frequent and contain mucus and blood. The abdomen is distended and tender along the colon. There is a distinct tendency for the disease to become subacute or chronic when the acuteness of the symptoms subsides; the child fails in general health and becomes greatly emaciated and very weak.

PROGNOSIS.—In acute dyspeptic diarrhea the prognosis is good. In entero-colitis it is generally favorable, but when the disease is of an acute dysenteric character there may be intense toxemia and death within a few days. Chronic cases last for five or six weeks, and the little patient may then gradually convalesce or die by inanition.

DIAGNOSIS.—The following table will illustrate the differential diagnosis of children's diarrheas:

ACUTE DYSPEPTIC DIARRHEAS.	ENTERO-COLITIS.	CHOLERA INFANTUM.
Often commences gradually, but attack may be sudden.	Usually follows dyspeptic form or occurs in the course of another disease.	Commences suddenly.
Vomiting a prominent symptom.	Vomiting not a prominent symptom.	Vomiting a prominent symptom.
Griping, colicky pain; worse before bowels move; little or no tenesmus; no localized tenderness.	Pain much more severe; increased by bowel movement; tenesmus; tenderness along colon.	Pain not a prominent symptom.

Acute Dyspeptic Diarrheas.	Entero-Colitis.	Cholera Infantum.
Stools feculent, grayish to yellowish and changing to green; sour or foul; quite copious; no mucus or blood.	Stools yellowish, becoming green; sour or foul; mucus and sometimes blood; scanty but frequent.	Stools soon lose feculent character and become thin, colorless, odorless and "rice-watery"; enormous quantity of fluid passed.
Constitutional disturbance often slight or temporary; may be little elevation of temperature, though it is sometimes high.	Constitutional disturbance always marked; fever always present and high; if not checked early gradual emaciation.	Profound constitutional disturbance; fever followed by collapse; emaciation very rapid, apparent in a few hours.
Recovery complete in a few days.	Recovery slower; tends to become subacute or chronic.	Death likely to occur within a short time.

Treatment.—*Prophylaxis.*—During the summer months great care should be given to the diet of infants. The food should be of the best quality procurable, and since this is mainly milk it should be obtained from as reliable a source as possible, so that the likelihood of bacterial contamination may be reduced to a minimum. It should, during the hottest weather at least, be sterilized or pasteurized unless the quality is known to be unquestionable. Cleanliness of vessels and implements is imperative. The child should be frequently bathed and protected from unnecessary contact with filth. If debilitated, a change of climate is desirable, and a few weeks spent at the seashore or in the country will do much to improve the child's nutrition.

Treatment of the Attack.—The initial treatment of summer diarrhea, whether dyspeptic or inflammatory, is practically identical. As a matter of fact the dividing line between the two affections is not a very clear one, since a little prolongation of a simple diarrhea is almost certain to set up inflammatory changes in the mucous membrane. If the stomach contains food or if there is vomiting, it should be washed out through an ordinary soft rubber catheter with plain boiled water. Older children may be given an emetic of a dram of syrup of ipecac. The bowels should be emptied as soon as possible. If the vomiting is not too severe this is done most quickly by administration of

a dram of castor oil. If the stomach is irritable or if there is considerable toxemia, as shown by high temperature, calomel may be given, ¼ to ½ grain, with 1 grain sodium bicarbonate every hour, until four or five doses have been taken or the stools change in character. If gastric irritability is excessive, give minute doses of calomel ($^1/_{10}$ to $^1/_{20}$ grain), as in the following:

Calomel .....gr. ¼—1
Bismuth subnitrate .....gr. 20
Sugar of milk.....gr. 20

Make 20 powders. One every half-hour for four or five doses, then every hour until the character of the stools change.

Irrigation of the colon with warm water helps to remove irritating matter and facilitates the action of the laxative. During the first twenty-four hours of the attack no food whatever should be given, even to nurslings. A dram or two of boiled water, to which two or three drops of brandy or whisky has been added if there is considerable prostration, may be given every half-hour or hour. The administration of food during this period is worse than useless, since it cannot be digested, and serves only to aggravate the symptoms. After the urgency of the attack has somewhat subsided, simple liquid foods may be given in small quantity, such as liquid peptonoids, albumin water, barley water, light meat broths and freshly prepared beef juice. Albumin water is prepared by stirring the whites of two or three eggs in a pint of water and adding a little salt. The barley water is best dextrinized. Jacobi's mixture consists of five ounces of barley water, the white of one egg, one or two teaspoonfuls of brandy or whisky and a little sugar and salt. These various foods may be alternated, in order to give a certain variety. Under no circumstances should the milk diet be resumed before the diarrhea is checked and the stools give evidence of a normal character, and then very gradually, adding the milk little by little to the other foods.

If, with emptying the bowels and careful regulation of the diet, diarrhea still persists, resort should be had to astringent and perhaps antiseptic drugs. Bismuth is the most generally useful. It may be combined with some of the simple astringents and antacids, as in one of the following:

Bismuth subnitrate .....dr. 5—6
Aromatic syr. rhubarb.....dr. 4
Chalk mixture, enough to make.....oz. 2
Teaspoonful every two to four hours.

Dr. Taylor of the Medical World recommends the following:

Bismuth subnitrate .....dr. 4
Powdered nutmeg .....dr. 2
Prepared chalk .....dr. 2
Zinc sulphocarbolate .....gr. 12
Syr. ginger .....oz. 3
One teaspoonful after each passage.

Holt prefers bismuth salicylate, 2 to 5 grains of which is given every two or three hours, as in the following prescription:

Bismuth salicylate .....dr. 2
Glycerin .....dr. 2
Listerine .....dr. 4
Chalk mixture, enough to make.....oz. 3
One teaspoonful every two or three hours, as necessary.

Bismuth subgallate may be used as in the following:

Bismuth subgallate .....dr. 1
Sodium bicarbonate .....gr. 5
Prepared chalk .....dr. ½
Creosote .....m. 5
Spirit cinnamon .....oz. ½
Distilled water, enough to make.....oz. 4
Teaspoonful after each movement.

Of the antiseptics, salol (1 to 2 grains), benzonaphthol (1 to 2 grains), and naphthalin (1 to 2 grains) are generally useful.

Of the astringents, tannigen, tannopin and tannalbin are quite generally satisfactory, as in—

Tannopin .....dr. 1—2
Bismuth salicylate .....dr. ½—1
Chalk mixture, enough to make.....oz. 2
Teaspoonful every two to four hours.

Or—

Tannalbin .....dr. 1—2
Salol .....gr. 12
Peppermint oil sugar.....gr. 12
Make 12 powders. One powder every two to four hours.

For the relief of pain opium may be given with caution. The

most convenient form for administration in a liquid preparation is paregoric, 5 to 10 drops at one dose; in powders, in the form of Dover's powder (¼ to ½ grain to child one year of age). In mild cases the use of camphor, chloroform or peppermint water in combination with a simple astringent, such as bismuth, will be found sufficient, as in the following:

Bismuth subnitrate	dr. 5—6
Listerine	dr. 3
Sodium bicarbonate	dr. ½
Spts. peppermint	gtt. 2
Syr. of ginger	oz. 1
Chloroform water, enough to make	oz. 4

Teaspoonful every two or three hours.

Local applications sometimes give great relief. Flannel wrung out of hot water may be applied to the abdomen or turpentine stupes, a linseed poultice, or a large mustard draft (1 part mustard to 5 or 10 of flour) may be applied to the abdomen.

In cases of *entero-colitis* the local treatment is of special value. This consists of irrigation of the colon, using a fountain syringe and a rectal tube or soft rubber catheter, introduced well up into the bowel. These irrigations may be used one to three times daily. Normal saline solution (teaspoonful of salt to the pint of warm water) or weak boric acid solution are used in such cases. The fluid should be allowed to run into the bowel and escape gradually until it returns clear. If there is blood or mucus, tannic acid solution (1 per cent) is used. After the more acute symptoms have subsided, if the disease shows a tendency to linger, nitrate of silver (1 per cent) is employed. This may cause some pain, which is relieved by the addition of 1 to 3 drops of tincture of opium. These solutions are generally used warm (about 100° F.), but if the temperature is high, cold water may be used. Tenesmus is relieved by the injection of half an ounce of starch water with 1 to 3 drops of tincture of opium added.

During convalescence general tonics are of value, and special attention must be given to the diet. Cases which tend to linger and where the digestion remains poor, do better upon an acid mixture than under continuance of the astringent and antiseptic treatment. The following prescription is recommended by J. Lewis Smith:

Dil. hydrochloric acid	m.	16
Saccharated pepsin	dr.	1
Bismuth subnitrate	oz.	2
Simple syrup	oz.	½
Distilled water	oz.	2

One teaspoonful after each feeding or nursing.

DYSENTERY.

DEFINITION.—An inflammatory disease of the large intestine, characterized by the passage of frequent stools containing blood and mucus.

ETIOLOGY.—The disease in its various forms is generally epidemic, although endemic cases are not infrequent. It is most common in warm climates; in the temperate zone it occurs during the summer months. Dysentery, like typhoid fever, is a water-borne disease. Predisposing causes are unsanitary surroundings; crowding in jails, military barracks and public institutions; malaria, and preceding diarrhea.

No specific germ of catarrhal dysentery has been found, although the bacillus coli communis and the bacillus pyocyaneus have been named as causative factors. Amebic dysentery is a disease of the tropics, although occasional cases are found in temperate climates; it is caused by the ameba coli, a unicellular protoplasmic organism, .015 to .030 mm. in diameter, whose habitat is in the colon. Its presence can readily be demonstrated in the stools by the use of the microscope. The bacteriology of epidemic dysentery has been studied recently in Japan, where Ogata has described a bacillus which he believes to be the cause. Flexner has studied these bacteria in the Philippines. This form is often diphtheritic and has furnished some severe epidemics. In a milder form the disease may be secondary to pneumonia, pulmonary tuberculosis and organic diseases of the heart and kidney.

PATHOLOGY.—In catarrhal dysentery the disease is usually confined to the colon and rectum, though in some cases the ileum is attacked. The mucous membrane is red, congested and edematous and covered with a tenacious layer of bloody mucus. The solitary glands are most affected, become swollen and are the seat of superficial ulceration, which may penetrate to the

submucosa. The erosion of the intestinal wall results in more or less extravasation of blood.

In amebic dysentery the large intestine only is affected. There is infiltration of the submucous layer, which becomes necrotic and is thrown off with the overlying mucous membrane, forming an ulcer. These ulcers may penetrate to the muscular layer; their edges are undermined and they are frequently connected by fistulous channels through the submucosa, which becomes extensively infiltrated. Rarely the entire colon may be affected by this intercommunicating ulcerative process, but usually it is localized. In the process of healing much connective tissue is formed in the ulcerative foci, which in contracting often seriously narrow the lumen of the bowel. These ulcers may perforate and cause peritonitis, but the most frequent complication is abscess of the liver, due to the migration of the amebæ coli; these abscesses may either be single or multiple. Abscesses of the lung sometimes complicate the disease.

In diphtheritic dysentery a false membrane is formed upon an inflamed mucosa. This is grayish to yellowish in color and in mild cases is thin and only surmounts the folds of mucous membrane. In severe cases it penetrates deeply into the submucous and mucous layers, dipping into the solitary glands and glands of Lieberkühn, covering sometimes an extensive area of the intestinal surface with a thick, fibrinous, necrotic exudate, which is finally thrown off in a slough with extensive destruction of tissue. Large ulcerative patches are usually left behind. The amount of surface varies greatly; the entire colon may be attacked or the disease may be localized in the sigmoid or rectum. Deformities are caused by the contraction of scar tissue.

Chronic dysentery is marked by the infiltration and thickening of the bowel wall, accompanied by more or less ulceration.

Symptoms.—Catarrhal dysentery may commence suddenly, but is usually preceded by several days of diarrhea, with loss of appetite and colicky pain. Mucus and blood appear in the stools and these increase in frequency, varying from six to eight passages daily to one hundred or more. Often the desire for stool is constant and associated with severe abdominal pain, a distressing sense of rectal heat, burning and tenesmus. At first fecal matter is passed in considerable quantity, mixed with scybalous

masses, but later the passages become very small and consist almost entirely of blood, mucus and pus. The tongue is dry and red; there is anorexia, great thirst and rarely vomiting. The abdomen is flat and tense and there is tenderness along the line of the colon. The temperature is seldom high, usually ranging from 100° to 101° F. The disease produces extreme debility and sometimes collapse. Toward the end of a week there is usually improvement in the symptoms, fecal matter reappears in the stool, and there is a slow convalescence. There is a fulminating type of catarrhal dysentery, seen in the Philippines (S. M. Long, U. S. A., N. Y. Med. Jour.), in which the patient usually dies in four to eleven days.

The symptoms of amebic dysentery are very much like those of the catarrhal form. It commences insidiously with diarrhea. The stools continue to increase in number, are very offensive, are watery and mixed with mucus and blood. In rare cases blood may be entirely absent for a long period. The number of passages varies considerably, but is usually less than in the catarrhal form, and tenesmus is less severe. A peculiarity of the disease is the tendency to intermission with frequent relapses. It usually persists for several months. The patient becomes anemic, and loses flesh and strength. Fever is not marked and sometimes the temperature is subnormal.

Diphtheritic dysentery in its primary form is an epidemic disease of high mortality. Its onset is sudden, often with chill, followed by a high temperature. The symptoms are those of the catarrhal form, much intensified. The stools contain patches of necrotic membrane and perhaps tubular casts of the bowel; they are of a dark-brown color and have a fetid odor. In contradistinction to the catarrhal and amebic forms of the disease the bowels are distended and tympanitic. Tenesmus is great. Typhoid symptoms often develop, with muttering delirium, subsultus and collapse. Relapses are common. When secondary to other diseases the symptoms are similar to the above, but less severe.

Any form of dysentery may become chronic. The symptoms are not well marked and seldom very characteristic. Pain in the abdomen and tenesmus are usually absent, and the stools may be free from blood except during acute exacerbations. These

are common and marked by pain and tenesmus, with frequent fluid stools containing mucus, blood and often pus. As a rule there is constant diarrhea of a mild type, the passages being frothy and consisting largely of a soft, pultaceous matter, containing fragments of undigested food. The frequency of the movements is increased by a mixed diet. The bowels are usually distended with gas and there are borborygmi. The tongue is red, like raw beef, the digestion is poor, the skin dry and harsh and the pulse feeble and rapid. There is anemia, wasting of flesh, loss of strength and mental enfeeblement. The disease often terminates in death from asthenia.

DIAGNOSIS.—The catarrhal form of dysentery is readily recognized. Examination of the rectum shows the presence of ulcers, carcinoma or foreign bodies. Amebic dysentery is shown by examination of the mucoid elements of the stool under the microscope. Diphtheritic dysentery may be mistaken for typhoid fever. In the latter disease there is enlargement of the spleen, rose-colored spots and the Widal reaction. Chronic dysentery may usually be differentiated from chronic diarrhea by the history of a preceding attack of dysentery from which the disease dates, and acute exacerbations in which there are abdominal pain and tenesmus with mucus, blood and pus in the stools.

PROGNOSIS.—The prognosis of catarrhal dysentery is generally good. Recovery takes place within a week or ten days. The mortality of amebic dysentery varies greatly in different epidemics. It is often high and is greatly increased by complications, of which abscess of the liver is the most common. Diphtheritic dysentery has the highest death rate and is an extremely fatal disease.

TREATMENT.—In all varieties of dysentery the diet should consist of food that produces little residue; in most cases it should be largely liquid. Meat broths, beef juice, beef peptonoids, peptonized milk, soft toast and well-cooked rice are generally allowed. Milk is not a desirable food in most cases. Rest in bed and the use of the bed-pan should be imperative. Hot fomentations, turpentine stupes or mustard drafts may be applied to the abdomen.

If the case is seen early a saline cathartic (½ ounce Epsom or Rochelle salts) or a full dose of castor oil with 15 to 20 drops

of laudanum should be administered and repeated if necessary to remove irritating fecal matter. The routine or repeated use of purgatives is harmful, especially in the amebic and diphtheritic forms of the disease. Weakness contraindicates the use of salines. Thompson recommends a daily dose of castor oil and laudanum in the catarrhal form and others a similar repetition of the saline, but this should be kept up for three or four days only.

Opium is demanded in some form for the relief of pain. If this is severe, morphin hypodermically is most effective; if less urgent, Dover's powder or tincture of opium may be administered by the mouth or the drug may be given by suppositories, combined with belladonna and other antispasmodics. The lead and opium pill is a good preparation. Before confining the bowels with opium it is advisable, in most cases, to irrigate the lower bowel with some bland solution, as advised later. For the relief of tenesmus an injection of laudanum (20 to 30 drops) in starch water (2 ounces) is sometimes efficacious. Ten to fifteen minims of a 4-per-cent solution of cocain may be tried or the following suppository:

Cocain ..... gr. 6
Ext. belladonna ..... gr. 3
Ext. opium ..... gr. 6
Cacao butter ..... a sufficient quantity
Make 12 suppositories. One every three or four hours.

Of the drugs taken internally, which are supposed to have a sedative effect upon the inflamed mucous membrane, the bismuth salts are most useful. The subnitrate or salicylate are much in vogue, but must be taken in large doses (½ to 1 dram every three or four hours) in order to be effective. Long (N. Y. Med. Jour.) considers bismuth subnitrate not only the most useful drug (except ipecac) but the most useful of the bismuth preparations. They may be combined with opium and intestinal antiseptics, such as salol, naphthalin, benzonaphthol, resorcin, guaiacol carbonate and creosote, with good results, as in the following:

Dover's powder ..... dr. ½
Benzonaphthol ..... dr. 1
Bismuth subnitrate ..... oz. ½
Make 12 powders. One every four hours.

Iodoform (2 to 3 grains in capsule) may be given several times a day for its curative effect upon the inflamed gut.

In cases of the catarrhal type that tend to linger, Hope's diarrhea mixture is a good remedy. Its formula is:

Nitrous acid	dr. 1
Tinct. opium	gtt. 80
Camphor mixture	oz. 8

Two ounces every three hours.

Silver nitrate ($\frac{1}{4}$ to $\frac{1}{2}$ grain) and zinc oxid (5 to 10 grains) in pill form three times a day are also recommended for internal treatment in chronic cases.

The classical treatment for tropical dysentery of the amebic or diphtheritic type consists in the administration of large doses of ipecacuanha. The patient is put to bed and the drug administered upon an empty stomach, preceded, half an hour before taking, by 15 to 20 drops of tincture of opium. Powdered ipecac, 20 to 30 grains, is then given in capsules, a mustard draft applied to the stomach and the patient not allowed to move for fear of exciting vomiting. A hypodermic of morphin will also help to quiet the stomach. If not retained the dose should be repeated. It may be given two or three times daily for a day or two.

Probably the most effective method of treating dysentery is the local one. Simple irrigation of the rectum with plain boiled water, boric acid or normal salt solution unloads the offensive mass which accumulates in the colonic pouch in spite of the frequent passages. In irrigating the bowel, the patient should lie upon the back with the hips elevated, and a rectal tube introduced high up into the bowel unless pain and tenesmus prevent. The fluid should be allowed to run until it returns clean, after which antiseptic solutions are used. The agents commonly employed are tannic acid (1 to 2 per cent), salicylic acid (1 to 2 per cent), mercuric chlorid (from 1 to 5000 to 1 to 3000), and silver nitrate ($\frac{1}{2}$ to 1 grain to the ounce). The silver solution is the most valuable of any, but causes considerable pain, and should not be long retained. A few drops of laudanum may be combined with it, and if pain is severe it should be immediately followed by a salt solution. If rectal ulcers are found they should be brushed with a strong solution of silver nitrate (10

grains to the ounce). Iodoform suppositories are valuable in such cases.

In amebic dysentery Osler recommends colonic injections of a solution of quinin (1 to 5000 to 1 to 1000). In some cases they are remarkably successful, in others they entirely fail, but all things considered are probably as near specific as anything which can be given. Better results are obtained by a preliminary irrigation of the bowel with normal salt solution, or better, with hydrogen peroxid in a weak solution. This removes some of the gelatinous discharge which covers the floor of the ulcers and permits more direct action of the quinin. In one case, recently reported, which resisted treatment, the patient was cured by performing an inguinal colostomy and irrigating the bowel through the artificial anus.

DIPHTHERIA.

DEFINITION.—Diphtheria is an acute contagious disease caused by the Klebs-Loeffler bacillus, characterized by a membranous inflammation of the pharynx, larynx or nasal passages and accompanied by constitutional symptoms produced by the absorption of toxins.

ETIOLOGY.—It is now a well established fact that diphtheria is caused by the Klebs-Loeffler bacillus. This bacillus is somewhat club shaped, about the same length as the tubercle bacillus (2.5 to 3 microns), but twice as thick. It is non-motile and may appear in a straight or slightly curved form, and is readily stained by an alkaline methylene-blue solution.

Associated with the diphtheria bacillus are pathogenic bacteria, especially staphylococci and streptococci; these add to the severity of the disease. The bacilli produce a local inflammation and the formation of membrane at the seat of infection. If they enter the circulation at all it is in scant numbers, and their presence there probably has little effect in the production of symptoms. However, by their local action toxins are produced which are absorbed and carried through the system by the lymphatics and blood vessels.

There are a number of predisposing factors such as age, season, climate, unhygienic conditions and chronic inflammation of the parts usually attacked. The majority of cases are under ten

years of age. It is most common between the period of two and seven, but is not infrequent during the latter part of the nursing period. It is not often seen in the new born or in the first few weeks immediately following. The writer recalls one case in his own experience of a child six weeks old. Adults are not often affected unless brought in close contact or having nasal stenosis or chronic pharyngitis.

Diphtheria occurs most frequently during the winter and spring. A temperate or cold climate seems to be most favorable to the propagation of the germ. Its development is aided by humidity. Consequently damp cellars and living rooms are places where it may be expected to flourish. Failure to observe the most common rules of hygiene may be considered an important predisposing factor. Vitiated air and dark rooms not only permit the growth of the bacillus but favor a long retention of vitality. The child that is frequently affected with tonsillitis or with catarrh of the nasal passages becomes easily infected by the bacillus. Any chronic condition of the throat or nose increases the susceptibility.

Infection most frequently takes place by direct contact. While treating or nursing a patient particles of mucus or membrane may be thrown by sneezing or coughing upon some portion of the mucous membrane of the attendant, as the lips or conjunctiva. It is possible also to become infected by inhaling the patient's breath or the vitiated atmosphere around him. The bacillus may be conveyed to a distance in letters, clothing and cushions of carriages or cars. It may retain its virulence for months or even years. Playthings handled by a child ill with diphtheria are not unusual agents for the transmission of infection.

It is now generally recognized that dogs, cats, horses or cows may be affected with the disease and thus be a source of contagion. Cases have occurred from drinking water or milk.

Pathology.—When the bacilli in sufficient numbers find lodgment on the mucous membrane there is local inflammation and the formation of a false membrane. The process by which the latter is formed is known as coagulation-necrosis. There is a pouring out of leukocytes, red blood corpuscles and fibrin with great proliferation of epithelial cells. The fibrin on exposure

[illegible] It [illegible] some [illegible] of pyæmia and toxæmia. In cases [illegible] an elevation of one to three degrees [illegible] on the second or third day. A sudden rise of temperature during the progress of the disease is an indication of a new area of infection. There is no distinct relation between pulse and the temperature. In the early stages the pulse ranges from 120 to 140. As a rule it is quick and feeble, but may become slow as the systemic poisoning increases.

Accompanying the chilliness or convulsion are headache, back-

ache, a dry skin, scanty urine and sometimes vomiting. As the disease develops the patient becomes dull and lies in a half-stupid condition. The difficulty in swallowing increases and nourishment is taken with reluctance.

The objective symptoms are of great importance. The false membrane generally appears first as white patches on one or both of the tonsils. These rapidly coalesce and extend to the anterior arches of the palate, to the uvula or the pharyngeal wall, and later to the nares or larynx. The membranous exudate soon becomes thicker and grayish-white or yellow, and even brown in appearance. The mucous membrane around the pseudomembrane is greatly inflamed and elevated above the latter. On removal of the false membrane a raw, bleeding surface is seen, which is soon covered by the formation of another membrane. The tonsils are swollen and greatly diminish the lumen of the pharynx. The deep cervical glands at the angle of the jaw are usually involved. They are not only swollen, together with contiguous tissue, but are hard and tender. This sign is considered important in diagnosis. The tonsils may be deeply invaded and ulceration and sloughing ensue with considerable destruction of the parts. When necrotic changes occur the breath becomes foul, with an odor somewhat characteristic. The tongue is dry and deeply coated. On the second or third day an erythematous blush more or less diffuse not infrequently appears, which may lead to the diagnosis of scarlet fever. Rarely, in severe cases, there may be a purpuric condition of the skin. The pseudomembrane may first appear in the mouth, nares or larynx. Any exposed mucous membrane or abraded skin may be the seat of the diphtheritic process.

In primary nasal diphtheria or in an extension from the throat there is a purulent and sometimes bloody discharge. The glands at the angle of the jaw are generally infected. The disease may be confined to the nose or it may involve the accessory sinuses or the Eustachian tubes. It is often difficult to perceive the membrane, so the main reliance must be placed on a bacteriological examination. Many of the cases are not recognized until other patients are infected.

When the membrane involves the larynx primarily the first symptom may be a harsh, brassy cough. The elevation of tem-

perature is not usually high. Absorption of toxins does not take place to much extent, and the constitutional symptoms are consequently mild. The stenosis causes dyspnea. The face soon becomes cyanotic, while there is retraction of the intercostal and suprasternal spaces. From the approaching suffocation the child is forced to sit up or even bend forward to get his breath. The membrane rarely extends to the pharynx, but may develop downward into the trachea and bronchi. Casts of the parts may be coughed up. When there is an extension to the larynx from the throat the additional symptoms are cough, hoarseness and difficulty in breathing.

COMPLICATIONS AND SEQUELAE.—Albuminuria is present in nearly all severe cases. In some instances blood casts, epithelial casts and scanty or suppressed urine are found as evidence of a true nephritis. Edema of the feet and puffiness about the eyes sometimes follow, and the patient may die in the coma following uremic convulsions.

Bronchopneumonia is the most dangerous complication. It is caused by the inspiration of pyogenic organisms and occurs most frequently in laryngeal cases requiring operation.

Otitis media occurs quite frequently, and may persist long after the disappearance of other symptoms.

Anemia, chronic catarrh of the parts attacked, and paralysis may follow diphtheria, the latter being by far the most important.

Paralysis due to a neuritis occurs in about 20 per cent of cases. It may occur rather early in the disease (end of the first week), or not until the third or fourth week from the beginning of the attack. The muscle of the palate is most frequently affected, which permits the passage of fluids into the naso-pharynx and through the nares. The muscles of deglutition may be paralyzed and occasionally the muscles of accommodation. In rare instances when the nerves controlling the lower extremities are affected paralysis ensues, which may result in slight permanent lameness.

Other nerves may be attacked. The most serious of all is a neuritis of the pneumogastric nerve, which may result in a paralysis of the heart and sudden death during convalescence, sometimes as late as the seventh week. In some cases the health

may fail gradually from fatty degeneration. Death in diphtheria results from suffocation, uremia, toxemia or paralysis of the heart.

DIAGNOSIS.—Scarlatina and follicular tonsillitis are the only conditions difficult to differentiate from diphtheria. When a rash is present in diphtheria, or when the rash is absent in scarlet fever, the diagnosis is difficult. A history of exposure to either disease is of value or the knowledge of an epidemic. Cases of scarlet fever having severe throat symptoms are not usually wanting in a rash. In a few days the desquamation, which only takes place in scarlet fever, is sufficient to clear up the diagnosis. The temperature as a rule is considerably lower in diphtheria and the constitutional symptoms less marked. A bacteriological examination is the best method of settling any doubt.

It is by no means easy to distinguish diphtheria from follicular tonsillitis at the outset.

DIPHTHERIA.	FOLLICULAR TONSILITIS.
Pain on deglutition.	Pain slightly more marked.
Temperature not high.	Temperature usually higher.
Membrane spreads from tonsils to uvula, palate, pharyngeal wall and other parts.	Exudate confined to mouth of follicles or if spreading and coalescing is confined to the tonsils.
Membrane separated with difficulty; raw, bleeding surface left on removal; membrane reforms rapidly.	Exudate more easily removed and without leaving bleeding surface; it reforms slowly.
Membrane continues to spread for several days.	Exudate diminishes or disappears in two or three days.
Membrane appears to be a part of the surface.	Exudate appears to be above the surface.
History of exposure to diphtheria.	No history of exposure; there may be history of previous attacks.
Submaxillary glands greatly swollen and very tender.	Glands moderately swollen and not very tender.
Klebs-Loeffler bacillus found in cultures from exudate.	Klebs-Loeffler bacillus not present.

Not all physicians are provided with a microscope or are familiar with the necessary technique and these must depend on the signs and symptoms. When any doubt exists it is better

to err on the safe side and treat the case as belonging to the more fatal disease. In larger cities efficient health boards relieve the physician of a bacteriological examination. In small places he must rely on himself. A good microscope with 1-12 oil immersion lens and a constant supply of a few fresh culture tubes of blood serum and an alkaline solution of methylene-blue constitute the necessary equipment. A portion of the exudate may be transferred to a tube of blood serum under proper aseptic precautions. If the tube is then placed in an inside pocket as close to skin as convenient the colonies of the bacilli will develop in twelve to twenty-four hours. They grow rapidly at the body temperature of 98° F. The bacilli are easily stained in three to five minutes' immersion in a methylene-blue solution. When the bacilli are abundant a slide may be at once prepared of the membranous exudate, stained and placed under the microscope. A positive diagnosis can sometimes thus be made when delay might result in a fatal termination of the case. It must be remembered, however, that a failure to discover the bacilli by this method should not prevent making a proper culture.

PROGNOSIS.—Diphtheria is a very fatal disease. Before the discovery and use of antitoxin the mortality ranged from 25 to 50 per cent. In the laryngeal form in some epidemics not over 10 to 30 per cent were saved. Even since intubation has been practiced the mortality has been exceedingly high.

McNaughton and Maddreus have collected reports of 5,346 intubations in America without antitoxin, which shows a mortality of 69.4 per cent. In 1,170 operations reported to the Pediatric society with the serum the mortality was 26 per cent. Holt, who recently collected reports of a large number of cases, summarized them in part as follows: "The percentage mortality of diphtheria has been reduced by antitoxin by more than one-half, both in hospitals and in private practice. The proportion of laryngeal cases requiring operation has been reduced one-half. Intubation, which formerly saved 30 per cent, now saves 70 per cent. Tracheotomy, which formerly saved 40 per cent, now saves 67 per cent. The actual number of deaths from diphtheria in Berlin and Germany has been reduced one-half; in the state of New York to 60 per cent of the former mortality; and in Chicago to 61 per cent of the former figures."

Dr. E. Rosenthal, of Cleveland, in answer to inquiries, received replies from 673 physicians, who reported the use of antitoxin in 12,375 cases with a mortality of 5.23 per cent. Of one hundred and fifty-seven cities reporting the mortality was 38.4 per cent in 183,256 cases previous to the antitoxin period, and 14.6 per cent in 132,548 cases since its use was adopted. From these reports it will be seen that the use of antitoxin greatly modifies the prognosis.

Cases in which the prognosis is especially grave are those having a general adenitis, marked cervical glandular enlargement, a purulent bloody discharge from the nose, a necrotic state of the throat, a large quantity of albumin and partial or complete suppression of the urine. Irregular pulse and subnormal temperature are unfavorable indications. The prognosis is grave if the pulse is above 150. A wide extension of the membranous exudate, because of the greater absorption of toxins, lessens the chance of recovery.

TREATMENT.—*Prophylaxis.*—Diphtheria is largely a preventable disease. Much can be done to increase the vital resistance of the child. Any nasal discharge should be promptly treated by mild antiseptic sprays. Nasal obstructions and adenoids should be promptly removed. If tonsillitis occurs repeatedly and the tonsils are enlarged, tonsillotomy is indicated. If the mouth is kept properly clean and defective teeth treated and filled, much has been done to lessen the probability of an infection by the Loeffler germ.

Any case of sore throat, though apparently of a simple form, should receive careful attention and in case the diagnosis is at all doubtful prompt measures ought to be taken at once to discover or eliminate the Klebs-Loeffler bacillus.

Adults with sore throat should not kiss children and indiscriminate kissing between children should be interdicted. When it becomes known that a child has been exposed to the contagion of diphtheria no measure for prevention ranks in importance to the prompt injection of 500 to 1,000 units of antitoxin. Immunity is thus acquired, if it is given early, lasting from three to four weeks. In a family of several children, the uninfected ones should, if possible, be removed from the house.

Sanitary Precautions.—When the diagnosis is made the

patient should be at once removed to a well lighted and easily ventilated apartment, isolated as much as possible from the living and sleeping rooms. It is highly important to obtain as much sunlight as possible. The room should be stripped of all articles not actually needed, such as rugs and hangings. Dishes and articles used by the patient should be placed in boiling water and all expectoration should be received into a solution of bichlorid of mercury or carbolic acid. Bed linen and clothing should be boiled or immersed for some time in an antiseptic solution.

Only the persons acting as nurses should be allowed in the room and these should take great care not to convey the contagion in their relations with others. On no account should they eat or drink in the sick room. Food left by the patient should be destroyed. Discharges from the nose should be collected on cloths and promptly burned.

Physicians and nurses can do much toward lessening the risk of carrying the infection by washing their hands in soap and water, afterwards immersing them in a bichlorid solution, 1 to 1,000, or alcohol. An overdress worn by the nurse and an ulster by the physician can be readily slipped off on leaving the sick room. If the physician does not choose to wear any protective clothing of any kind he can disinfect himself in another room or before visiting another patient by standing in the fumes of chlorine gas generated by the action of a small quantity of hydrochloric acid poured on a dram of potassium chlorate.

It is claimed that a person having diphtheria can disseminate the disease for three to six weeks from the beginning of the attack. For that reason he should not associate with others nor go to public places until entirely free from all signs of the disease. Before leaving his room he should receive an antiseptic bath or be rubbed with alcohol (50 per cent).

The room should be disinfected according to the rules of the local board of health. When no such board exists sulphur may be burned. Four pounds are required for every thousand cubic feet of space. Six to eight ounces of formaldehyde solution (40 per cent) may be used for the same amount of space. It should be sprayed on sheets hung on lines, the room having pre-

viously been made as tight as possible. This method was first devised and used by Dr. Behm of the Chicago Board of Health. He recommends six ounces per 1,000 cubic feet of space and claims that the disinfection is thorough, as proved by hundreds of tests. He uses a special spray apparatus invented by himself, The room should be kept tightly closed for eight hours after the spraying. The Ohio and Indiana State Boards of Health have reported the most favorable results from the sheet method of using formalin.

Apparatus arranged to introduce the gas through a key-hole are now being used to a considerable extent. In his work on Hygiene of Transmissible Diseases, Abbott states that he has "obtained the most satisfactory results through the use of formalin to which 10 per cent of glycerin has been added, as recommended by Schlossman, and through the employment of a generator after the plan of that advised by Novy and Waite. In these tests we found that 80 per cent of all exposed infected objects in a room could be disinfected when 500 Cc. of the formalin-glycerin mixture per 1,000 cubic feet of air-space was completely evaporated and the room kept closed for three or four hours."

Serum and Medicinal Treatment.—Of first importance in consideration is the use of antitoxin. It is as much a specific in diphtheria as quinin is in malaria. The record of thousands of lives saved annually and the testimony of a great number of physicians are incontrovertible proofs of its efficacy. It is not only certain in antagonizing the toxins but safe and harmless in its action. The most untoward result is sometimes an urticarial rash and, in rare instances, swelling of the joints, with pain and prostration; this is supposed to be due to ferments in the serum.

Antitoxin gives good results only when injected under the skin, as only a small amount seems to be absorbed when given by the mouth. There has been a growing tendency to increase the dose. The maximum amount given five years ago is not now considered adequate for the mildest cases. It is important to give a large initial dose. This may range from 2,000 to 6,000 units, according to the severity of the attack. If no improvement follows within twelve hours the dose should be repeated.

No doubt many lives have been lost by timidity in the use of antitoxin at the first injection. It cannot be expected that antitoxin can undo the effects of poisons on certain cells by combining with them and producing degeneration; but it certainly can and does fortify and immunize tissue-cells not already affected. For this reason antitoxin should be administered as early as possible and in sufficient quantity to immunize the healthy cells. Objections to large dosage can no longer be urged on the ground of deleterious effects, for a large amount is no more apt to produce urticaria than a moderate amount. One authority claimed it to be impossible to give a fatal overdose.

The chief reasons against using a large dose at once in every case are the expense, discomfort at the seat of injection caused by pressure of the increased volume, and that it is unnecessary in mild cases. The mild cases may, however (British Med. Jour.), develop into a severe type and a life should not be endangered to save discomfort, while the expense, when small doses are employed, may be greater in the end from the necessity of several repetitions. Some British authors advocate 8,000 to 12,000 units at once in extreme cases. Holt advises 5,000 units for the first dose in severe cases when seen late, to be repeated after six or eight hours should there be no improvement. In the Boston City Hospital, where the mortality has been reduced from 46 and even 50 per cent in pre-antitoxin days to 10 per cent (1899-1900), 4,000 units are given at once in a severe case five years old, and repeated every four to six hours until the patient begins to improve. Children under five receive 3,000 units.

With the increase in the curative dose there has been an increase in the quantity used for immunizing. For a child under one year 300 units are considered sufficient, while 500 to 700 units ought to be given to a child of five.

The beneficial results following the administration of antitoxin is improvement in the pulse and general appearance of the patient, a reduction of the glandular swelling, while the membrane curls up at the margins and is soon cast off. It may entirely disappear in forty-eight hours.

The serum may be injected at one of several elective sites, but most operators seem to prefer the interscapular region or

the gluteal muscles. The seat of injection should be thoroughly cleaned and the needle and syringe boiled. After the injection the puncture should be sealed with collodion.

The antitoxin method of treatment does not seem to lessen the number of cases of paralysis unless used early or before degeneration of certain nerve cells has taken place, nor does it combat the effect of streptococci or other pus organisms when a mixed infection is present.

The use of serum does not contraindicate the administration of drugs. Stimulation is often required to meet the great prostration and danger of heart failure. For this purpose probably no other drugs are able to fill the place of strychnin and alcohol. Several authors advise the use of the latter from the beginning. An advantage lies in the fact that it can more safely be trusted in the hands of untrained or incompetent nurses. When the exhaustion is great and the pulse feeble, strychnin should be given in full doses, either hypodermically or in small tablets by the mouth. When exudation is excessive from the larynx atrophin may be given with advantage. Nitroglycerin and aromatic spirits of ammonia may be extremely useful in threatened sudden heart failure. It might sometimes be convenient to use the following:

Caffein	gr. 10
Sodium benzoate	gr. 10
Dist. water	oz. ½

By the rectum once or twice daily.

The injection of a normal salt solution under the skin or per rectum may be of great benefit in tiding the patient over a critical period of weakness.

For the diphtheritic paralysis the syrup of iron iodid, strychnin and electricity may all be of benefit. Massage may be helpful in cases of paralysis of the lower extremities.

The line of treatment in diphtheria is clear when antitoxin can be readily obtained, but what shall be done when the time lost in obtaining it may permit of a fatal termination? In such instances probably no drug will give better results than calomel administered in small doses at frequent intervals until free purgation results. At the same time it may be blown in the nose or on the tonsils. Should tonsillitis be mistaken for diphtheria no

mistake in treatment has been made, for calomel is extremely valuable in the former disease. Calomel fumigations are highly recommended as being quite efficient in the laryngeal form. Fifteen grains may be sublimed for fifteen minutes every two or three hours. For further treatment calcium sulphid given to saturation or until the odor is exhaled in the breath, has given good results in the hands of many. It may be used alternately with nuclein or protonuclein. Iron is an old and widely used remedy. It may be useful in combating anemia if it does not derange the stomach. The tincture of myrrh, according to some reports, is one of the best drugs that can be given. The following formula is an excellent combination:

Tinct. iron chlorid	dr. 2
Tinct. myrrh	dr. 2
Glycerin	oz. 1½
Syrup ginger, enough to make	oz. 3

One teaspoonful once in three hours to a child of three.

The steam tent is recommended by some, but it is doubtful if the benefit gained from the heated moisture is equal to the loss of oxygen. A bronchitis kettle or a basin over an alcohol lamp will meet all purposes and yet permit of a good air supply.

Oil of eucalyptus, carbolic acid and turpentine, in the proportion of one part of the first and second to eight parts of the last, may be mixed with the water, using about one ounce to the quart. This will largely overcome the disagreeable odor.

Local Treatment.—The question of local treatment depends upon the age of the patient, the day of the disease when the patient is first seen and the availability of antitoxin. Antiseptic remedies, if applied to the membrane when first formed, by killing great numbers of bacilli, may render great aid in preventing the production of toxins On the other hand, if too vigorously applied to the healthy portion of the throat or too caustic in action they may produce such irritation and lack of resistance that the membrane may spread rapidly. The following solution is claimed by Loeffler to rapidly kill the bacilli:

Menthol	parts 10
Toluol	parts 26
Sol. perchlorid of iron	parts 4
Absolute alcohol, enough to make	parts 100

To be applied locally once or twice daily.

Hydrozone or peroxid of hydrogen may be used for the same purpose. Sulphur may be of some use in mixed infection.

A 25 to 50-per-cent solution of lactic acid is sometimes employed to destroy the membrane. Good results are claimed from the use of papoid.

Glycerin of papoid	dr.	4
Carbolic acid	gr.	8
Powd. camphor	gr.	8
Glycerin, enough to make	oz.	2

Apply every two or three hours.

Bromin may be used according to this formula:

Bromin	m.	4
Alcohol	dr.	1
Simple syrup	dr.	1
Water	dr.	2

Apply every four hours.

Better use can often be made of the atomizer by the nurse or parents. A large number of different mixtures are used. Solutions of peroxid of hydrogen seem to meet with the greater favor. It can be used in three to five volume solutions in water or mixed with other antiseptics.

Hydrogen peroxid	dr.	4
Sodium borate	dr.	2
Glycerin	oz.	1
Rose water, enough to make	oz.	4

Use in atomizer every two or three hours or pour with a spoon into the nose.

It is advisable to use the spray for some time after the disappearance of the membrane. In nasal diphtheria irrigation by means of a fountain syringe with an alkaline solution may be of benefit in detaching the membrane. The child should lie on the side with the nozzle inserted in one nostril and the other free for its ready escape. Care should be exercised to prevent the entrance of any fluid into the Eustachian tubes and for this reason the mouth should be kept open while sprays or irrigations are used.

These various applications to the throat or parts affected are doubtless of considerable value if they can be made without great objection on the part of the patient. They can usually

be made to children above seven with little difficulty but most children under that age have to be forcibly held in order to make the application. During the first few hours of the disease the strength is still good and struggling does little harm while the swabbing may do some good. To continue frequent applications throughout the disease in such cases is needless, often cruel and sometimes positively dangerous. The benefit of local treatment is more than counterbalanced by the patient's exhaustion. Sudden heart failure may follow such a struggle.

External applications of ice to the throat may afford considerable relief. Ichthyol (10 to 25 per cent), mixed with lanolin or with iodin ointment, is an external remedy worthy of trial. A mixture of turpentine, camphor and lard may be used for the same purpose. Inunctions of silver ointment can be made in a marked streptococcus infection. Good results have been obtained from this remedy in septicemic conditions.

Diet.—During the acute stage the food should be liquid. Milk broths, liquid peptonoids and albumin water should afford the chief nourishment. Ice cream has been extolled as a food in this disease and no doubt will be relished by the patient when other food is repugnant. Holt states that infants should not be allowed to nurse at the breast but should be fed on milk taken therefrom.

As milk is given more than any other single article of diet, care should be exercised that it does not disagree with the stomach. If disagreeing when given pure it may be diluted with water, limewater or soda-water or even peptonized. Whites of eggs may be strained and mixed thoroughly with water, adding some flavoring extract. This mixture is usually readily taken. Eggnog may be used in older subjects. If the patient has great difficulty in swallowing it may be necessary to resort to rectal feeding or to the use of a soft catheter passed through the nose and down the esophagus. The latter method is preferable in young subjects. After intubation it is well to withhold food for a number of hours or else give it according to one of the above methods. When the membrane has disappeared and the tongue becomes clean a more liberal diet may be allowed. This, however, will require restriction upon the appearance of a feeble

pulse and weak heart impulse with increase in lateral dullness, accentuation of the second sound and diminution of the first,—signs of fatty degeneration which require the closest attention. Great care must be exercised in this condition to prevent the distention of the stomach with gas or with an excess of foods or liquids. Extreme cases should be fed by the rectum with milk thoroughly peptonized.

Intubation and Tracheotomy.—When the larynx is becoming rapidly occluded and the patient shows signs of progressive asphyxia, such as sternal and clavicular retraction, cyanosis, aphonia, dyspnea, stridor and great restlessness, it becomes necessary to perform either intubation or tracheotomy. The first is preferable in a majority of cases, its mortality in patients under five years being lower than attends tracheotomy; above that age the latter seems to give the best results. Intubation has grown much in favor since the introduction of the serum treatment. Before that period an average of about 30 per cent of intubated patients were saved and 70 per cent lost, but now with the use of antitoxin the figures are reversed.

The advantages urged in favor of intubation are that it is easier to perform; that the parents will more readily consent to a bloodless operation; that no wound is left to heal; that the danger of bronchopneumonia is less; it requires no anesthetic; it permits the patient to cough and whisper; while if it fails in giving relief, tracheotomy can be performed. On the other hand the tube may be coughed up or become occluded by membrane. It may interfere with deglutition.

The tube should remain in place until the symptoms and signs point to the disappearance of the membrane and a general improvement. This period averages 112 hours. When performing intubation it is advisable to have at hand for instant use the proper instruments for performing tracheotomy, as the introduction of the tube may push the membrane into the trachea, at once shutting off the breath. It is not necessary to give the method of either operation here as both are described in works on general surgery.

DYSMENORRHEA.

DEFINITION.—Painful menstruation.

VARIETIES.—Congestive; obstructive; membranous; neuralgic and ovarian.

ETIOLOGY.—Dysmenorrhea is not a disease but a symptom. The underlying cause is often nervous and it may be hereditary; it frequently occurs in hysterical women. Disturbance of the reflex mechanism is probably present in many cases. Women who live among unhygienic surroundings, are poorly nourished and follow exhausting occupations which allow no time for rest at the menstrual period frequently become sufferers from dysmenorrhea. Imperfect development of the genital organs, uterine displacements and other obstructions to the free escape of the menstrual blood are common causes, as are also tumors, inflammatory diseases of the uterus, tubes or ovaries, and lacerations and other injuries received during labor. Taking cold is often an exciting cause.

SYMPTOMS.—The symptom of dysmenorrhea which gives it the name is the pain. This varies greatly in character and severity. It may be simply a sense of fulness and discomfort or a dull ache; it may be severe, continuous and neuralgic or paroxysmal, with expulsive pains relieved by the passage of blood clots. The location of the pain varies. In obstructive forms the uterine body is most painful; in neuralgic forms the pains change from place to place; in other cases the ovaries and tubes are the seat of disturbance. Sometimes, in the congestive and inflammatory types, backache is a troublesome symptom.

In the congestive form the pain commences with the menstrual flow and lasts until it is well established, when it subsides; it is generally associated with feverishness, loss of appetite and constipation.

The pain of the obstructive form is intensified by every effort to expel the menstrual blood; this usually comes out in clots, after which there is comparative relief until another effort at expulsion is made.

A peculiar form is membranous dysmenorrhea, in which there is an exfoliation of the endometrial mucosa at each period, forming a false membrane. The pain is paroxysmal in character,

increasing in severity until a portion of the membrane is expelled. This gives temporary relief.

In the neuralgic form the pain appears some hours before the menstrual flow. It is severe, cutting and colicky and centers in the abdomen, radiating to the shoulder or thigh.

In the ovarian form there is inflammation of the ovaries, which are enlarged and tender. The pain commences several days before the period and diminishes when the flow becomes established, unless it is so scanty that it fails to relieve the pelvic congestion, in which case it may continue throughout the period.

TREATMENT.—It should be kept in mind that dysmenorrhea is a symptom and not a disease; the underlying trouble should be ascertained and treatment directed toward its elimination if permanent results are to be obtained. In all forms of painful menstruation rest in bed is important. If taking cold is the cause, treatment should commence with a hot mustard foot bath or sitz-bath, after which the patient should be put to bed, warmly covered with flannel blankets, hot bricks placed at the feet and a hot water bag, turpentine stupes or a mustard draft upon the abdomen. Hot ginger tea or chamomile infusion may be administered internally, or if the pain is very severe a full dose of Dover's powder (10 grains) may be given. If the bowels are constipated they should be emptied promptly by a quickly acting saline laxative, aided if necessary by a hot-water or soapsuds enema. The depleting method of treatment is generally most valuable where the flow is scanty. Two grains of apiol in capsules twice daily is useful in this form. This treatment usually suffices for ordinary congestive cases, unless the condition is recurrent, from persistent local congestion, and requires intermenstrual depletive treatment. In such cases the bowels should be kept freely open by the administration of salines; the hot vaginal douche should be used daily and vaginal tampons saturated with boro-glycerid or ichthyol and glycerin frequently applied to the uterine os.

The medicinal treatment of dysmenorrhea is largely addressed to the relief of pain. As a rule opium or its alkaloids should not be given to these patients, since they are often neurotic and especially prone to contract drug habits. One of the most useful drugs is belladonna; it is best given in the form of suppository,

¼ to ½ grain, repeated every two to four hours until the desired effect is produced or the physiological effects of the drug appear. Or if preferred the tincture of belladonna may be given by the mouth, combined with carminatives and antispasmodics, as in—

Tinct. belladonna	dr.	2½
Comp. elixir crampbark (N. F.), enough to make	oz.	4

Teaspoonful every hour for two or three doses, then every three hours until relief or physiological effects are produced.

The coal tar drugs (acetanilid, phenacetin, antipyrin, etc.) are often of great value for the relief of pain but must be used cautiously. Other drugs which are of especial value in dysmenorrhea are gelsemium, cannabis indica, cimicifuga, hydrastis, potassium bromid, pulsatilla, viburnum prunifolium and viburnum opulus. These may be variously combined with carminatives, forming some very excellent preparations. A few formulas are added:

Fl. ext. gelsemium	dr.	1½
Potassium bromid	dr.	2½
Syrup ginger	oz.	2
Chloroform water, enough to make	oz.	4

Dessertspoonful every two or three hours for four or five doses.

Antipyrin	dr.	2
Potassium bromid	dr.	2
Fl. ext. viburnum prun	dr.	6
Brandy	oz.	1
Syrup orange flowers	oz.	1
Distilled water	oz.	4

Dessertspoonful two or three times a day.—Lyon.

Of the viburnum preparations various excellent proprietary preparations are now upon the market. The compound tincture of virburnum (Tinctura Viburni Opuli Comp. N. F.) is a mixture of this class and equally efficient. Its formula is—

Viburnum opulus	Gm.	3.5
Dioscorea	Gm.	3.5
Scullcap	Gm.	1.0
Cloves	Gm.	5.0
Cinnamon	Gm.	6.5
Glycerin	Cc.	6.5
Alcohol	Cc.	75.0
Alcohol, 5 vols. Water, 1 vol., to make	Cc.	100.0

Of this the dose is one or two teaspoonfuls, best taken in hot water, every half-hour or hour. It is an excellent adjuvant for the administration of opium or belladonna when these drugs are indicated.

In neuralgic dysmenorrhea the ordinary remedies indicated for neuralgia in other portions of the body may be given. The following is recommended by Potter:

Ext. belladonna	gr. 4
Ext. stramonium	gr. 5
Ext. hyoscyamus	gr. 5
Quinin sulphate	gr. 40

Make twenty pills. One pill three times a day.

Neurotic patients do well on the following:

Asafetida	gr. 2
Ext. valerian	gr. 1
Ext. Cannabis ind	gr. ½

One or two pills three times a day.—Lyon.

Patients of the neuralgic type should be advised to avoid excitement, worry, exhaustion or late hours and should be encouraged to take plenty of light exercise in the open air, with a nutritious diet,—attending carefully to the digestion and to the hygiene of the bowels. Patients who are run down or anemic require a similar regime to build them up, with tonics of iron, quinin, arsenic and strychnin.

In obstructive dysmenorrhea it is usually necessary to resort to surgical interference before a cure can be effected. Dilatation of the cervix with tents or instruments often gives relief. If there is endometritis curettage is indicated, or intrauterine applications of iodized phenol or some similar preparations. The same method may be tried in the membranous form. After-treatment with tampons and douches is usually beneficial. If these procedures fail more radical surgical interference is indicated.

DYSPEPSIA—*See Gastric Neuroses, and Gastritis.*

EARACHE.

ETIOLOGY.—Earache is due to a number of causes, including neuralgia, boils, eczema, impacted cerumen and foreign bodies in the external auditory canal, but the most common one is inflammation of the middle ear.

SYMPTOMS.—Pain in the ear is the prominent symptom but others are usually present, significant of the condition which causes it. Acute inflammation of the middle ear is generally preceded by coryza and sore throat and attended by slight fever and constitutional disturbance. A careful examination of the ear will easily determine such causes as boils, eczema, etc. Inspection of the ear in cases due to neuralgia will show absolutely no sign of inflammation. There may be decayed teeth from which the pain radiates. The detection of the trouble in young children is sometimes attended with difficulty. The child may put its hand to the affected ear and if the disease is inflammatory tapping upon the mastoid or anterior to the meatus or traction upon the tragus will cause pain.

TREATMENT.—The simplest and best method of treating earache is by the application of dry heat, as a hot water bag, a hot brick or plate. When this does not relieve the pain recourse may be had to the instillation of warmed fluids. Irrigation with hot boric acid or normal saline solution may be tried or a weak aqueous solution of morphin and atropin, using a dose suitable to the age,—as if it were to be taken by the mouth. A formula recommended by S. Theobold contains the following:

Atropin	gr.	½
Cocain	gr.	1
Sweet almond oil	dr.	1

This should be applied with the patient lying down so that the affected ear is up. The child should be kept in this position for at least ten minutes. A little cotton can then be put in the ear and the head raised. A favorite and often effective remedy consists of equal parts of laudanum and olive oil, warmed in a teaspoon and dropped into the ear. Carbolized olive oil or glycerin may be used in the same way, but as a rule the oily preparations are in disfavor, since they are likely to be uncleanly, are not antiseptic and are removed with difficulty. The following formulas are used for instillation, in the manner directed:

Olive oil	dr.	4
Chloroform	dr.	4
Camphor-chloral	m.	40
Glycerin	dr.	4½
Oil sweet almonds	dr.	2¾

Probably the most satisfactory remedy, all things considered, is cocain. An aqueous solution may be used or it may be applied as an ointment.

Cocain .....gr. 6
Water .....dr. 2

One to three drops to be instilled into the ear.

Or—

Cocain .....gr. 12
Lanolin .....dr. 2

Apply upon a cone-shaped piece of cotton wrapped upon a probe, and push gently well back into the meatus.

If the earache is due to the neuralgia, examine the mouth for decayed teeth; these, if present, should be properly filled or extracted. If the neuralgia is recurrent treat the underlying cause. (See Neuralgia.)

Boils are treated by the anodyne applications (as cocain), and by antiseptic irrigation. An application of hydrogen peroxid thoroughly cleanses the surface after which an ointment of yellow oxid of mercury may be gently rubbed in or applied on the cotton cone. The following formula is used:

Yellow oxid of mercury.....gr. 4
Petrolatum .....dr. 2

This causes some pain at first, but if allowed to remain usually gives relief. The quickest relief for a furuncle, especially if there is pus formation, is by deep incision and evacuation. Spraying with ethyl chlorid makes it less painful.

Eczema is treated by first removing scales; this is done by irrigation with hot borax solution or by swabbing with hydrogen peroxid. After drying, a simple ointment, as used in the same type of eczema elsewhere, should be rubbed in persistently every day. Ichthyol is good in many cases, as

Bismuth subnitrate .....dr. 1
Ichthyol .....dr. 1
Petrolatum, enough to make.....oz. 1

In inflammatory involvement of the middle ear, treatment should be addressed to the nasal and pharyngeal congestion and inflammation. Spraying the nares with Dobell's solution is always useful and never harmful. Authorities differ as to the wisdom of opening up the Eustachian tube by the use of a solution of cocain followed by the oily spray of menthol and the

inflation of the ear with the Politzer bag. Some claim that there is danger of introducing infective germs by this method. Gleason advises the introduction of the vapor of chloroform and menthol, by placing the nose of the Politzer bag, which has been filled with this vapor, into one nostril and emptying it gently while the patient puffs out his cheeks—this following the cocainization of the nares.

When pus forms in the middle ear and the drum begins to bulge it should be evacuated by paracentesis.

ECLAMPSIA; PUERPERAL CONVULSION.

DEFINITION.—A convulsive seizure attacking a woman before, during or after labor.

ETIOLOGY.—It is believed to be due to the irritant action of toxins retained in the system because of the defective eliminative action of the kidneys. On account of the larger amount of work thrown upon the nutritive organs of a pregnant female there may be some interference with the process of metabolism in the liver or elsewhere and a larger percentage of partially oxidized nitrogenous by-products to be disposed of by the kidneys. Disease of the kidneys is undoubtedly present in some cases; perhaps in most it is entirely absent, but they are unable to compensate for the increased work. Overeating of nitrogenous food and constipation with the formation of intestinal ptomains may be considered as factors.

SYMPTOMS.—Premonitory symptoms are severe frontal headache, vertigo, disturbances of vision, gastric disturbance, dryness of the skin, edema, constipation and mental stupor. When any of these symptoms appears during pregnancy an immediate examination of the urine should be made. The presence of a small amount of albumin is less significant than a reduction in the total quantity of urine and a diminished excretion of urea.

An attack usually comes on abruptly. The eyes are fixed; there is a vacant stare; the eyeballs twitch and the pupils are contracted; the muscles of the corners of the mouth and of the face are drawn; the eyeballs roll and the head is thrown from side to side. The seizure rapidly spreads to other groups of muscles until the whole body is convulsed with a tonic spasm;

the respiration is difficult and stertorous; the pulse frequent and irregular; the skin cyanotic and froth appears between the clenched teeth. Following this, there is a period of clonic spasms during which the muscles rapidly contract, violently flexing the limbs and jerking the head. During an attack there is loss of consciousness. After it subsides the patient falls into a deep sleep, semi-comatose in nature, from which she may gradually recover, perhaps to go into another convulsion, or she may pass into a condition of profound coma, if the fits rapidly succeed one another. The duration of a seizure is short, seldom more than a minute. More than a hundred have occurred in a single case within twenty-four hours.

Urine.—The amount of urine is usually greatly decreased; it may be only one-half or one-third of the amount secreted in health. Albumin (paraglobulin and serum-albumin) is usually present in considerable quantity; a large amount of serum-albumin signifies extensive renal injury. Urea is decreased in quantity; its estimation is important. Casts are usually numerous.

Diagnosis.—Epilepsy and hysteria may rarely simulate an eclamptic attack. The history of the case and an examination of the urine will easily settle the diagnosis.

Prognosis.—The condition is a grave one, the maternal mortality averaging about twenty per cent, that of infants about fifty per cent. The gravity of the prognosis is increased by its occurrence early in pregnancy, by great frequency of the fits, and by suppression of the urine, unrelieved by treatment.

Treatment.—*Prophylaxis.*—During the course of pregnancy and especially its latter months, it is important that every woman should be under medical supervision. The diet should consist of easily digested and oxidized but nutritious food in which milk, butter, the cereals and fresh vegetables and fruits predominate. The bowels should not be allowed to become sluggish, and the activity of the kidneys and skin should be maintained by the free use of water internally and externally. Regular daily exercise in the open air should be provided for. The urine should be frequently examined.

If headache, vertigo or other symptoms suggesting eclampsia appear, ascertain at once the degree of urotoxic elimination. If

it is reduced, as shown by small excretion of urine and a reduction of urea, vigorous measures should be taken to prevent the occurrence of eclampsia. Red meats of all kinds, tea, coffee and alcohol should be forbidden. The principal article of diet should be milk; if the case is severe an exclusive milk diet is to be recommended and the patient put to bed.

The other eliminating organs should be put in the best working order. Where the symptoms are not immediately pressing a dose of cascara sagrada night and morning may be sufficient to regulate the bowels; in more urgent cases a compound cathartic or some similar purgative pill may be administered every night at bedtime; or the salines (Epsom, Carlsbad or Rochelle salts) may be given every morning. An occasional dose of calomel at night is valuable. To keep the skin in good working order a hot bath should be taken every night and if the patient is vigorous a cold sponge or shower bath followed by friction every morning.

Diuretics as a rule are not required and serve only to overstimulate an exhausted kidney. The milk diet and the drinking of large quantities of water furnish a natural and harmless means of increasing the flow of urine. Basham's mixture is much prescribed as a diuretic iron tonic in the prophylactic treatment of these cases. Its formula is—

Tinct. iron chlorid	Cc. 2
Dilute acetic acid	Cc. 3
Solution ammon. acetate	Cc. 20
Elixir orange	Cc. 10
Syrup	Cc. 15
Water	Cc. 50

When this treatment fails, two gallons or more of normal salt solution should be injected into the bowel daily. This increases the action of both kidney and skin.

Treatment of the Attack.—The two principal objects of treatment are (1) to mitigate the severity of the spasms and (2) to secure rapid elimination of retained toxins. The latter is much the more important and should never be lost sight of.

1. For the relief of the distressing symptom—the convulsion—the drugs depended upon are chloroform and chloral. Chloroform is given by inhalation at the beginning of every convulsion, in order to abort it if possible and to reduce its severity. Chloral

is administered by the rectum in heroic doses (60 grains in 4 ounces of water) to prevent their recurrence. This dose may be repeated in three or four hours. It should be remembered that these drugs are depressing and that their prolonged administration in large doses may seriously weaken the heart. Morphin is sometimes given hypodermically but its tendency to check excretion by kidneys and bowels makes it unsuitable in most cases. Tyson says that it is contraindicated in interstitial nephritis. One of the most valuable drugs for the relief of the spasms is veratrum viride. It reduces the force of the heart and dilates the vessels, thereby relieving cerebral tension and "bleeding the patient into his own vessels." By relaxing spasm of the renal arteries it also promotes urinary elimination, thus helping to meet the second indication. 10 to 15 minims may be given hypodermically, followed by 5 to 10 minims every hour until the rate of the pulse is reduced to 60 or less, at about which point it should be kept by the further use of the drug.

2. To eliminate the toxins we depend mainly upon catharsis and diaphoresis. If the patient can swallow, 10 grains each of calomel and sodium bicarbonate may be given, or two or three drops of croton oil in olive oil or glycerin may be dropped upon the back of the tongue. The bowels are then to be thoroughly flushed with hot normal salt solution (110° to 115° F.). This not only helps to unload the bowels but stimulates the skin and kidneys. It is one of the most important measures to be employed. The soft rectal tube should be used and the fluid introduced well up into the colon. The normal salt solution may also be used by hypodermoclysis, the needles being inserted beneath the patient's breasts.

The hot pack is used to cause sweating. All clothing is removed and the patient wrapped in blankets wrung out of hot water. The whole body should be enveloped, the blankets being carefully folded in between and around the limbs. Dry blankets are used to cover these; a piece of rubber sheeting helps further to retain the heat. Hot bricks on which alcohol is poured placed around the body beneath the blankets helps to start perspiration. An ice-cap should be placed upon the head on account of the danger from cerebral congestion.

In vigorous, full-blooded patients, bleeding sometimes gives

good results; a pint or more of blood should be withdrawn from the arm. Venesection should be followed by the subcutaneous injection of normal salt solution.

If, in spite of these efforts, the convulsions increase in severity or frequency and the coma becomes more and more profound, it is necessary to empty the womb. But this should be considered a last resort to be undertaken after other methods have failed.

ECTHYMA.

DEFINITION.—A skin disease characterized by the presence of pustules upon an inflamed base.

FIG. 5. ECTHYMA.

ETIOLOGY.—It occurs in the poorly nourished and cachectic.

Unhygienic surroundings, poor food and diet are predisposing causes. The exciting cause is infection of the skin with pyogenic germs. The distinction between it and other forms of infective dermatitis is not well-marked. Some cases are practically boils; where scaling is marked it simulates a pustular eczema.

SYMPTOMS.—The eruption consists of flat, discrete, deep yellow-colored pustules, each one upon an inflammatory base. These at first are as large as a pea but may increase to several times this size. When these rupture a brownish crust is formed. If this is removed an ulcer will be found which may penetrate to the corium, leaving when healed a slight scar. The lesions cause a burning pain and in the crusting stage slight itching.

PROGNOSIS.—Always favorable.

TREATMENT.—The general health of the patient should be improved by nourishing food. Hot baths, clean clothing and protection of the skin from scratching are to be recommended. Tonics of iron, quinin, strychnin or cod-liver oil may be needed.

A mild antiseptic ointment should be applied to the skin after the removal of the scales. Either of the following will be found satisfactory:

Calomel	gr. 10
Zinc oxid	dr. 1
Petrolatum	oz. 1

Or—

Ammoniated mercury	gr. 10-15
Petrolatum	oz. 1

If the ulcers are deep these should be thoroughly cleansed antiseptically, as with hydrogen peroxid and dressed with iodoform, europhen or some similar dusting powder.

ECZEMA.

DEFINITION.—An acute or chronic, afebrile, inflammatory disease of the skin, characterized by an eruption which assumes a great variety of clinical forms and is associated with more or less itching, heat or burning.

VARIETIES.—Like other inflammatory diseases eczema may be acute or chronic. It is classified according to clinical type into four fundamental varieties: (1) Erythematous eczema; (2) papu-

lar eczema; (3) vesicular eczema; (4) pustular eczema. There is a great tendency for these to become mixed,—that is, two or more varieties may co-exist in the same case and even in the same lesion. In addition to these there are several other clinical forms which are really only exaggerated expressions or developments from the preceding. These are eczema rubrum (including eczema madidans); eczema fissum; eczema sclerosum; and eczema squamosum. For convenience in the discussion of treatment we also classify the eruption into lesional and regional varieties.

Etiology.—Eczema is due to constitutional or local causes or to both. It may occur in the debilitated or in persons who are, so far as can be seen, perfectly well. Among the constitutional causes are digestive disturbances, certain articles of food and drink, constipation, anemia, debility and derangement of the sympathetic nervous system. Diseases of the assimilative and excretory organs undoubtedly exert a powerful influence upon its etiology. It occurs in Bright's disease, diabetes, asthma, rheumatism and gout. Haig believes it to be, in many cases at least, an expression of the uric acid diathesis and calls attention to the fact that it may alternate with attacks of asthma, rheumatism or other diseases due to this cause, and that different members of a family may suffer from uricemia as expressed in these various forms.

By some the disease is believed to be parasitic but this view is not yet supported by sufficient evidence. Local irritants which may cause it include moisture, heat and cold (it is most common in winter), mechanical friction, dye-stuffs, acids, alkalies and other chemicals and excessive use of water, especially if it is hard or used with strong soap. Certain occupations predispose to the production of the disease because they require the constant application to the skin of such an irritant.

Pathology.—There is dilation of the vessels of the affected part, hyperemia of the skin, infiltration with an exudate and changes in the cellular structures. The most important of these, according to Unna, are as follows: (1) An edematous condition of the epithelial cells. These do not become converted into true horny cells but preserve their nuclei to the surface; they retain their moisture, so that although partially dried mechanically,

they are thrown off in masses or scales. This process is most marked in scaly eczema. (2) There is a multiplication of the prickle cells, causing a thickening of the epithelial layer. This is most marked in the papular form. (3) There is an intracellular edema or exudate of fluid into the spaces between the cells. When this collects in sufficient quantity the result is a vesicle.

The predominance of any one of these changes determines the variety of the disease. In chronic eczema there is also more or less proliferation of the connective tissue elements and thickening of the deeper layers of the skin.

SYMPTOMS.—Eczema is rarely attended by any constitutional disturbance. If the skin is highly inflamed or the amount of surface large there may be a slight rise of temperature. The subjective symptoms include itching, burning and heat. The relative intensity of these symptoms depends upon the variety of the disease. The severity of the subjective symptoms is proportionate to the acuteness of the attack.

Erythematous Eczema.—In this form a portion of the skin becomes uniformly reddish or violet in color, swollen and sometimes edematous. The eruption may occur in several patches which subsequently coalesce, and it tends to spread. The patient complains of a burning sensation and usually there is some itching which may lead to scratching, followed by serous oozing. If it occurs about the eyes the lids become edematous and often greatly swollen; the same is true of other loose cellular tissues. The skin is dry and roughened and when the disease subsides there is usually some exfoliation of scales. It may assume one of the chronic types.

The most common site of erythematous eczema is the face, but it may appear upon any portion of the body.

Papular Eczema.—The eruption consists of minute papules, pin-point to pin-head in size, bright or dark red in color and either discrete or closely crowded together. Often there is an admixture of vesicles and occasionally pustules. The itching in this form of eczema is most intense and the tops of the papules are invariably torn by the finger-nails in the effort to obtain relief by scratching. Bloody serum exudes and dries upon the surface, forming dark-colored scales. The exudate in this form of eczema is less profuse than in other varieties. It often

becomes chronic, assuming in many cases the squamous form of the disease.

It generally attacks the extremities upon the flexor surfaces of the joints or appears upon the back of the neck. The chronic form is most likely to occur upon the legs.

FIG. 6. PAPULAR ECZEMA.

Vesicular Eczema.—This consists of a number of small vesicles usually situated closely together and forming upon a red and swollen surface. These increase in size, coalesce and soon rupture, discharging a yellowish, serous secretion. This dries upon the surface with the formation of thick, fibrinous crusts which act as a further source of irritation and aggravate the condition. Usually new vesicles are formed as the older ones rupture, there-

by extending the course of the disease. The part may become infected, in which case the discharges become purulent. If the discharge is very profuse the crusts may be prevented from forming, giving a red, angry, weeping surface (eczema rubrum). The subjective symptoms are itching and burning. In favorable cases the symptoms subside and recovery is gradual.

The scalp and face of young children, and the back of the neck and flexor surfaces of adults suffer most.

Pustular Eczema.—This is not a common form. It may originate in one of the preceding varieties or may be primary. Its clinical course is similar to that of vesicular eczema, except that the vesicles contain purulent matter and the crusts are greenish-yellow or yellowish-brown in color. It occurs principally in strumous or poorly nourished children. The itching, heat and burning is less severe, as a rule, than in the preceding forms.

The scalp and face are the most common sites.

Eczema rubrum may follow any of the preceding varieties. The skin becomes raw and inflamed and discharges a large amount of serum, sometimes bloody. Crusts may form, or if prevented by the profuseness of the secretion, an angry, denuded, oozing surface is left (eczema madidens). There is more or less swelling, infiltration and thickening of the skin.

Eczema fissum is characterized by the formation of cracks or fissures in the skin. Chapping of the hands or lips is a familiar example of this form of eczema.

Eczema sclerosum is a chronic type marked by infiltration and thickening of the skin, giving a leathery-like consistence. There is a low grade of inflammatory reaction. Sometimes there are wart-like prominences. It is most common upon the hardened surfaces of the hands and feet.

Eczema squamosum is essentially chronic, usually following the erythematous, papular or vesicular varieties. The prominent symptom is the presence of scales in considerable quantity. The itching and burning are variable but are usually not marked.

Diagnosis.—Usually a careful examination of the case will fix the diagnosis without difficulty, although the great diversity of its manifestations gives us a multiplicity of varieties. Walker says: "One is justified in diagnosing as eczema any acute or chronic catarrhal inflammation of the skin of which he does

not know the nature or cause." Practically, there are in other diseases pathognomonic symptoms which simplify this somewhat formidable proposition.

In erysipelas there are usually well marked constitutional symptoms, fever, a glistening skin, marked swelling, bullæ, a well-defined line of demarcation between the affected and healthy skin. It spreads very rapidly and does not invade the scalp.

In herpes zoster the eruption follows the course of a nerve trunk, and is usually preceded by severe neuralgic pain. The vesicles are large, discrete, arranged in groups and do not readily rupture. Instead of itching and burning there are sharp shooting pains. It tends toward spontaneous recovery.

In scabies the eruption is caused by the acarus, whose burrow can be readily found. It attacks the fingers at their intersection and less rarely the flexor surfaces of the limbs, the axillæ, the nipples, penis and inside of the thigh. The face is exempt and itching is worse at night.

Psoriasis usually attacks the extensor surfaces of the joints, the back, or scalp; the patches are usually small, their contour is well defined; the scales are dry, silvery and glistening; itching is usually absent; there is extreme chronicity.

Sycosis is confined to the bearded region, begins in the hair follicles and is attended with slight itching or burning.

Ringworm is circular in shape, with inflamed periphery and clear center. It is due to the tricophyton and is contagious.

In impetigo the pustular lesions are larger; they are usually discrete, more superficial, and itching is slight or absent. It may be contagious.

Pruritus presents no eruption except that produced by scratching. Itching is disproportionate to the size of the lesion. Often paroxysmal.

PROGNOSIS.—Eczema does not tend to end naturally in recovery, but under suitable treatment most cases may be cured.

TREATMENT.—*Hygienic.*—When called upon to treat a case of eczema the physician should make a careful examination of the patient in order to determine the predisposing and exciting causes. Usually these can be found and then the treatment must be adjusted to meet the particular demands. Of great importance is the regulation of the patient's habits. If the

occupation is such as to cause irritation of the skin it should be changed, or so modified that this feature is eliminated. Sometimes removal to a warmer climate during the winter months is beneficial. On the other hand the salt air of the seashore is often harmful. Moderate exercise may be indulged in unless it produces friction against the inflamed areas of skin. In severe cases rest in bed may be necessary. Frequent use of soap and water upon the skin is usually to be forbidden but this should not be construed as a license to uncleanliness. Removal of dirt and of secretions is necessary before other treatment can be instituted and demands thorough ablution. For this purpose "soft" water should be used, without soap. A little oatmeal or bran added to the water, or tied in a bag and used instead of a washrag, is emollient and pleasant to the skin. After washing and drying the skin the local application should be immediately made.

Diet is extremely important. If there is digestive disturbance of any kind, food must of course be regulated according to its nature. As a rule we may follow the dictum of Walker that those foods or drinks are bad for eczema "which produce any increased flow of blood to the skin." Rich food, pastries, hot breads, spices, pickles, pork, veal, jams, cabbage, etc., are usually placed in this list. Alcohol in any form is to be absolutely forbidden and tea and coffee are to be used in moderation. Milk, when it agrees with the patient, is probably the most valuable food. Fresh fruits and vegetables, the cereal foods, eggs, fish and a limited amount of lean meat are generally allowable. Bulkley says that for the purpose of increasing nerve nutrition the amount of digestible fats and phosphates should be increased. He therefore recommends the use of wheat breakfast foods and of butter and other animal and vegetable fats in considerable quantity. If the case gives evidence of uricemia a still more rigid diet upon the lines laid down by Haig is worth trying. This consists in the exclusion of lean meat and articles rich in extractives and containing chemical combinations of a similar nature, such as meat soups, tea, coffee, etc. Milk is the ideal food and in severe cases may, for a time, be the exclusive food.

Medicinal Treatment.—Drugs are often required internally to correct digestive disturbances. Constipation is relieved by the

administration of saline laxatives, including the Carlsbad, Hunyadi, Apenta and Friederichshall waters. Calomel or a mercurial is to be given if the liver is sluggish. Cascara sagrada and rhubarb are also good laxatives. The latter is especially suited to children, as given in a "rhubarb and soda" mixture. Bitter tonics and hydrochloric acid are indicated if there is an atonic condition of the stomach. The following prescription (Gould's Cyclopedia) is suited to these cases when associated with constipation:

Tinct. nux vomica	oz.	½
Dil. hydrochloric acid	oz.	½
Comp. tinct. cardamon	oz.	3
Fl. ext. cascara sagrada	oz.	3

Teaspoonful in water after meals.

We have alluded to the value of antilithemic treatment in cases due to uricemia. It is probably in these cases that the alkaline diuretics produce the best results. If this condition is suspected, in addition to the restricted diet, the citrate, acetate or bicarbonate of potassium should be given in 20 to 30 grain doses several times a day, or lithium carbonate or citrate may be prescribed, preferably in the form of the effervescing tablets. To eliminate the uric acid from the system, sodium salicylate is believed to be the most effective drug; 5 to 10 grains should be given in solution three times a day.

Tonics are indicated if the patient is debilitated or cachectic. Cod-liver oil, the hypophosphites, quinin, iron, strychnin and arsenic should be given to meet special indications. *Arsenic must never be given in the acute forms of eczema,* but is of distinct value in the old, chronic, scaly types, in which the inflammatory element is nearly absent.

Local Treatment.—The general rule may be given to use soothing applications in acute eczemas, and stimulating applications in chronic eczemas. Between these two extremes considerable variation is demanded, dependent not only upon the nature of the lesion but also upon its site.

Remove all scales by soaking in oil and then washing gently before making remedial applications.

Acute Form.—A good rule is to avoid the use of ointments during the more acute forms of the disease. The oil penetrates

the epithelial cells, causes them to swell and dams back the discharge. Usually powders and lotions are more satisfactory at this stage, relieving the distressing itching and burning which mainly call for treatment. The powders not only act as protectives but, in the "weeping" forms of the disease, as absorbents. Carbonate of magnesia has the greatest capacity for water; probably starch is the most generally useful. Other substances are rice flour, talc, boric acid, oxid and carbonate of zinc, kaolin, Fuller's earth, lycopodium, and violet powder. Salicylic acid may be added as an antipruritic. These formulas are useful:

Boric acid	dr.	2
Calamin	dr.	2
Starch, enough to make	oz.	2

Or—

Venetian talc	oz.	½
Zinc oxid	oz.	½
Starch	oz.	1

Or—

Salicylic acid	gr.	10
Zinc oxid	oz.	½
Bismuth subnit	oz.	½
Talcum	oz.	1

Or—

Rice powder	dr.	4
Talcum	dr.	2
Zinc oleate	dr.	1
Bismuth subnitrate	dr.	1

Of the lotions the simplest is a saturated solution of boric acid and in the milder forms of the disease this acts admirably. A weak solution of carbolic acid is useful when there is much itching. Glycerin is quite generally added to these prescriptions but it should be remembered that it is irritating to many skins. Bland powders which are left upon the skin as protectives are often used in these lotions, especially in the moist forms of the disease. The following is recommended by Walker:

Boric acid	oz.	1
Calamin.	dr.	3
Zinc oxid	dr.	2
Glycerin	dr.	2
Water, enough to make	oz.	6

In moist eczema Hearn recommends:

Sol. lead subacetat	dr.	2
Zinc oxid	dr.	2
Glycerin	dr.	6
Limewater	oz.	6

Lotio nigra ("black wash") is an old and favorite remedy in this form of the disease. Its composition is

Calomel	Gm.	.75
Water	Cc.	3.50
Limewater	Cc.	100.00

White, after bathing the part with this lotion, applies a small amount of zinc oxid ointment.

Some other preparations are useful during the acute stage. The following approximates Unna's gelanthum:

Tragacanth	dr.	2½
Gelatin	dr.	2
Glycerin	dr.	6
Thymol	gr.	¼

Distilled water, a sufficient quantity.

The tragacanth and gelatin are each placed in a covered jar with 10 ounces of water, in a steam bath for twenty-four hours, then strained, glycerin added, placed again in the bath for an hour, thymol and water added to make 12 ounces. Tar, ichthyol, etc., may be added if needed. This makes a thin coating when painted on the skin and is decidedly useful in erythematous and papular eczema, where itching is severe and there is little discharge.

The starch poultice is another useful remedy, when the inflammation is intense and the suffering severe, especially in children. It consists of one teaspoonful of boric acid, four tablespoonsful of starch mixed into a smooth paste with cold water, and a pint of boiling water to make a jelly. It is applied when cool. If discharge is free it should not be kept on long.

When the discharge begins to subside pastes may be used. These are to be preferred to ointments because they contain a larger percentage of powders which act as absorbents. A simple one is

Magnesium carbonate	oz.	1
Petrolatum	oz.	1

The most popular is Lassar's paste, which contains—

Zinc oxid	dr.	2
Starch	dr.	2
Petrolatum	dr.	4

Salicylic acid (10 to 20 grains to the ounce—less in children) is often added. This preparation is one of the most useful in the treatment of eczema, of whatever type, after the weeping has commenced to subside.

Subacute Form.—As the case progresses and the discharge gradually diminishes more stimulating applications may be made. At first the pastes may be used as a base, later the ointments. Among the substances which may be used with them are salicylic acid, carbolic acid, menthol, resorcin, ichthyol and the tarry preparations. In using the stimulating applications they should be applied at first upon a small area in order to learn if they have an irritating effect. Below are formulas for this class of cases:

Ichthyol	dr.	2
Lassar's paste	dr.	6

Or—

Tar ointment	dr.	1
Zinc oxid ointment	dr.	7

Or—

Carbolic acid	gr.	10
Calomel	gr.	20
Zinc oxid ointment	oz.	2

The diachylon ointment of Hebra (made of litharge cooked in olive oil) is a most valuable base for ointments of this class. Following are some prescriptions:

Salicylic acid	gr.	10—20
Zinc oxid	dr.	1
Diachylon ointment	oz.	1

Or—

Ichthyol	dr.	1—4
Zinc oxid	dr.	1
Diachylon ointment	oz.	1

In these preparations treatment should be commenced with the smaller amount of salicylic acid, ichthyol or tar, which may be gradually increased, as shown by its tolerance.

Chronic Form.—Scaly eczemas of whatever kind demand, before further treatment, the removal of all crusts and scales.

This may be accomplished by soaking the part in olive oil for several hours. The oil may be applied upon layers of lint, covered with oiled silk and held in place with a loose bandage. After removal, the scales may in many cases be rubbed off by pledgets of cotton dipped in oil or vaselin. In the more severe cases the part is washed with soap and water, a thorough scrubbing with tincture of green soap being advised, if this is well borne.

Applications to chronic eczema should be stimulating. The tarry preparations are the most generally useful. These include such preparations as pine tar (pix liquida), oil of white birch (oleum rusci), oil of cade and balsam of fir (terebinthina Canadensis); also such mineral derivatives as ichthyol and creolin. Salicylic acid is also very useful in chronic eczema. These drugs are usually prescribed in ointments. Vaselin, zinc oxid ointment, and Hebra's diachylon ointment are good vehicles. Stimulant applications should first be tried upon a small surface in order to determine the tolerance of the skin. The strength should at first be weak and then gradually increased. The ointment is usually to be thoroughly "rubbed in." Of the wood tars from ½ to 2 drams to the ounce of the ointment is the usual strength. They are also used in liquid form, as Bulkley's "liquor picis alkalinus."

Pine tar .....dr. 2
Caustic potash .....oz. 1
Distilled water .....oz. 5

A dram or more of this solution is added to a pint of water and applied with friction. It is often very irritating to a sensitive skin, but is a valuable remedy where there are hard, thickened patches.

When the soap is desirable a good way to prescribe it is as follows:

Green soap .....dr. 3
Pine tar .....dr. 3
Alcohol .....dr. 3

To be well rubbed in.—Stelwagon.

Of ointments the following are useful:

Salicylic acid .....gr. 20—30
Pine tar .....dr. 1— 2
Zinc oxid ointment.....oz. 1

Or—

Creolin	dr.	½
Ammoniated mercury	gr.	10
Vaselin	oz.	1

In pustular eczema the following is commonly in use:

Ammoniated mercury	gr.	5—10
Zinc oxid ointment	oz.	1

In cases which resisted all other treatment Hebra recommended scrubbing the part with a 25-per-cent solution of caustic potash until the epidermic cells were removed. The skin was then washed clean, carefully dried and a suitable sedative ointment applied. This treatment produces a violent reaction and is altogether too severe for ordinary use. A better plan is to rub in with a flannel rag a small piece of green soap, using a little warm water to produce a good lather. This destroys the upper layer of the cuticle, exposes the diseased area, to which suitable ointments may now be applied, to be held in place by fixed dressings.

There are some regions of the body which require special consideration.

Hairy Regions and Face.—The scalp and face are often places of attack; especially is this the case in infants. The hair becomes matted with thick crusts and scales, which require removal with oil, as already directed, although Chapin depends upon prolonged soaking with a very weak antiseptic solution (carbolic acid, 1 to 100, or bichlorid of mercury, 1 to 10,000. Lassar's paste, to which is added 5 to 10 grains to the ounce of salicylic acid and diluted with equal parts of vaselin or boric acid ointment in very young children, is a favorite application. It should be thoroughly rubbed in and to prevent scratching in very young children a mask of lint may be worn.

In eczema of the beard the face should be shaved or the hairs clipped every other day. Hairs surrounded by pustules should be pulled out, all crusts removed with oil and one of the following ointments rubbed in two or three times a day:

Salicylic acid	gr.	20
Sulphur	gr.	20
Zinc oxid ointment	oz.	1

—Walker.

Or—

Salicylic acid	dr. 1
Diachylon ointment	oz. 1

Ano-Genital Region.—In eczema of the female genitals the urine should always be examined, since diabetes is not an infrequent cause. The likelihood of friction in this region makes the disease difficult to manage. In eczema near the anal orifice, the bowels must be regulated and hemorrhoids, fissures, etc., treated if found present. Scrupulous cleanliness is necessary. In the acute cases any of the soothing and antipruritic lotions may be used, or the part may be sponged with very hot water. Mild or stimulating ointments may be used in the subacute and chronic cases, according to indications. Salicylic acid and the tars are useful. Diachylon ointment is a good vehicle. In severe chronic anal eczema cauterizant applications may be necessary for cure.

Eczema of the Legs.—In this form it is a good plan to stimulate the portal circulation by an occasional mercurial. The character of the disease in this locality is determined by the dependent position of the limbs, and it is especially intractable where there is a varicosity of the veins. If this is present an effort should be made to cure it by suitable measures. In order to prevent blood stasis, the limb should either be elevated or a bandage applied that makes pressure. Remedies suited to the grade of eczema are to be used.

Hands and Feet.—The thickness of the skin in these localities demands special measures. We must remove as much as possible of the horny layer in order to reach the seat of the disease. Immersion in hot water and shampooing with green soap or the use of the following (Gould's Cyclopedia) will usually have the desired effect:

Salicylic acid	gr. 20
Green soap	gr. 10
Borated lard	oz. 1
Cold cream	oz. 1

Apply thoroughly twice a day.

Or the caustic potash solution (20 to 30 per cent) may be used for this purpose. Following this a weak salicylic acid ointment is applied. The tars are very useful in this form of the disease and may be used in considerable strength

EMPHYSEMA.

DEFINITION.—A disease of the lung characterized by the abnormal distention of its tissues with air.

VARIETIES.—The common varieties are: (1) Interstitial emphysema, due to the escape of air into the interlobular spaces. This may be caused by injury, as that produced by a fractured rib, or by the rupture of the air vesicles by violent coughing. It produces no marked symptoms unless air escapes into the pleural space (pneumothorax). (2) Vesicular emphysema is due to dilatation of the air vesicles. This is the common form of the disease and will be described in this article. A rare form (3) is atrophic emphysema occurring in very old and emaciated persons.

ETIOLOGY.—Vesicular emphysema is in some cases hereditary, due to congenital deficiency of the blood supply or weakness of the elastic fibres of the vesicular walls. In children it is sometimes caused by whooping cough. It is most common in advanced life as a result of chronic bronchitis, bronchial asthma or cardiac dilatation. Glass blowing, playing wind instruments and similar occupations which tax the expansile power of the lung are said to produce it. Compensatory emphysema may occur during the course of pulmonary diseases which by incapacitating a part throw additional labor upon another portion of the lung.

PATHOLOGY.—Upon opening the chest the lung does not collapse, but may bulge through the opening. It pits upon pressure, is pale in color and may show evidence of degenerative changes. The distended and enlarged air cells may often be seen bulging beneath the pleura. The walls of the vesicles have become weakened, inelastic and thinned, with great consequent vesicular enlargement. Often these walls break down and two or more cells coalesce. The elasticity of the lung is destroyed and it becomes soft and flabby, while from destruction of the capillary network there is marked obstruction of the blood supply and enlargement of the right heart.

SYMPTOMS.—Of the subjective symptoms the most marked is shortness of breath upon exertion. This is accentuated by any increase in the severity of the bronchitis which is almost

always present. The respiration is short, "catchy" and wheezing, expiration being prolonged. Cough is present, its severity being proportionate to the attendant bronchitis. During attacks of dyspnea or coughing the patient usually becomes markedly cyanotic.

There is no elevation of temperature,—in fact, it may be subnormal. There is generally emaciation, cachexia, and debility. In advanced cases tricuspid insufficiency may develop with slight edema of the ankles.

PHYSICAL DIAGNOSIS.—Inspection shows the characteristic "barrel-shaped" chest in which the antero-posterior diameter is increased, making the sternum prominent and giving a bulging, roundish shape to the thorax. The patient is stooped, the shoulders elevated, the head thrown forward, making the neck appear abnormally short and the clavicles and muscles of the neck prominent. The expansion of the chest is slight, its movement being nearly vertical. Respiration is largely diaphragmatic and the abdomen and lower intercostal spaces are retracted during breathing. The latter are relatively wide as compared with the upper intercostal spaces. The apex beat of the heart is obscured, but pulsation in the epigastrium is marked.

Palpation.—Vocal fremitus is present, but diminished. The apex beat of the heart often cannot be felt.

Percussion.—There is increased resonance all over the chest and the area of dullness over the cardiac, hepatic and splenic regions is diminished.

Auscultation.—The expiratory sound is prolonged, the normal time ratio between inspiration and expiration sometimes being reversed. The respiratory murmur is feeble. If there is bronchitis sibilant and sonorous rales are to be heard.

DIAGNOSIS.—Little difficulty attends the diagnosis of this disease. The barrel-shaped chest, the dyspnea, cough, hyperresonance and prolonged expiration are sufficient, in connection with the history, to determine its nature.

PROGNOSIS.—An incurable disease, but a very chronic one. Its course may be arrested in some cases. It seldom produces death, this usually resulting from complications, as pneumonia or failure of cardiac compensation.

TREATMENT.—The treatment is that of the underlying cause

—usually bronchitis. Since an acute attack of the latter disease may increase the emphysema, care should be taken to prevent taking cold. If the means of the patient permit, residence in a warm, equable climate is desirable. In any case flannel should be worn next the skin the year around, over-heated and under-ventilated rooms avoided and gentle, daily exercise in the open air advised. The bronchitis should be treated as elsewhere directed (see bronchitis). Undoubtedly the iodids give the best results. Syrup of hydriodic acid may be used when the stomach is intolerant of the potassium or sodium salt. If coughing is troublesome sedatives must be used, since violent paroxysms increase the emphysema. Codein ($^1/_6$ to $^1/_4$ grain) or heroin hydrochlorate ($^1/_{12}$ grain) are useful for this purpose and less likely than morphin or opium to disagree with the stomach or check excretion.

Bronchial asthma is a common complication. It must be treated upon the lines elsewhere described (see Asthma). Paroxysms should be checked as soon as possible by suitable remedies,—hypodermics of morphin if necessary.

The presence of gas in the stomach increases the dyspnea. Attention should be given to the digestion and suitable food prescribed. In severe cases carbohydrates, which are prone to undergo fermentative changes, should be given in reduced quantity or not at all. The bowels should be moved regularly.

If the case continues to advance the heart may need strengthening by suitable tonics, as strychnin, ammonia, digitalis and strophanthus. Diuretics, as citrate or acetate of potassium, and cathartics, are often needed to relieve pulmonary congestion and edema. Iodid of potassium, beside its action upon the bronchitis, is a valuable diuretic. Venesection sometimes gives relief in urgent cases. A prescription recommended by Stevens in failing heart is:

Strychnin sulphate	gr. $\frac{1}{2}$
Powd. digitalis	gr. 20
Powd. squills	gr. 20
Reduced iron	gr. 20

Make 20 pills. One three times a day.

The inhalation of compressed air and expiration into rarefied air has been used with good results.

EMPYEMA—*See* Pleurisy.

ENCEPHALITIS—*See* Brain, Inflammation of.

ENDOCARDITIS, ACUTE.

DEFINITION.—Inflammation of the endocardium or inner lining of the heart.

ETIOLOGY.—Endocarditis has usually been divided into two forms: (1) Simple or benign, and (2) malignant. No etiological or pathological reason exists for this division, but it is convenient to use the terms for the sake of greater clearness in description. This affection is nearly always secondary. It occurs most frequently in acute rheumatism and next in pneumonia. It may occur in the course of any infection, for it is undoubtedly in itself simply a process of infection and its benignity or severity is due to the degree. This statement assumes that rheumatism is due to an infection. Some still maintain that the simple acute form is sometimes due to the toxins of the co-existing disease. In nearly all cases a microorganism has been found when properly sought. Most frequently this is one of the pyogenic germs or the diplococcus of pneumonia.

Endocarditis is also found frequently in scarlatina, but rarely in typhoid fever or diphtheria. It has occurred in the course of tonsillitis, and is a frequent complication of chorea.

PATHOLOGY.—The parts affected, in order of frequency, are the mitral, aortic and pulmonary valves, the endocardium of the left ventricle, left auricle and right auricle. The portion of the valve first attacked is about two millimeters from the free edge or at the line of contact of the valves. In some cases, the lesion extends to the chordae tendinae and parts of the wall near the septum. The first thing to appear is an area of opacity or slight roughness extending across the valve or the endocardial wall. Small nodular elevations bead-like in appearance may form on this area. These may finally develop into distinct nodular, fibrinous growths often called warty vegetations. The name usually given to this condition is simple or rheumatic endocarditis. When the inflammatory process is more severe there may be a greater amount of fibrin deposited, often irregularly. These may be detached and necrotic changes occur leading to suppuration or

the formation of irregular ulcers. Sometimes these may be almost entirely covered with fibrin. This form is usually called malignant. The microscopic changes are desquamation of endothelial cells, round cell infiltration and proliferation of connective tissue. Masses of bacteria may be demonstrated in the layers of endothelium or in the fibrinous deposit.

In the process of repair there may be gradual absorption of the fibrinous deposit or it may be broken off and swept into the circulation as emboli, leaving a thickening of the endocardium at that particular point. The fibrin may become calcified while still attached to the valve, or there may be distortion of the parts from contraction of newly formed connective tissue. Valves may be destroyed or even one of the chordae tendinae. Valvular aneurysm may also occur. The inflammation may extend to the myocardium or even to the pericardium.

Symptoms.—There is no characteristic group of symptoms. Many cases develop insidiously and may only be discovered by accident. In the simplest form there may be a slight acceleration or irregularity of the pulse, with, perhaps, a slight elevation of temperature. Palpitation may be present. In severe types a chill is often the first symptom, or chills may occur irregularly throughout the course of the disease.

Headache is common at the beginning of the attack. There is more or less insomnia and nearly always anorexia. Some difficulty in breathing is experienced, while the countenance shows evidences of cyanosis. The tongue is dry and thickly coated. The spleen is always swollen and often tender, while the liver is often similarly affected. The urine is dark-colored and may contain albumin and blood corpuscles more or less crenated. Tenderness is often found over the kidneys.

The severe form is sometimes divided according to the predominance of certain symptoms into the following types: (1) Pyemic, (2) typhoid, (3) cerebral and (4) cardiac. The pyemic type is found in cases having infected external wounds, puerperal infection, or acute necrosis. The usual symptoms of pyemia are present, such as chills, fever, sweats and loss of strength, and these may completely mask the heart symptoms. In the typhoid type, which is the most frequent, symptoms are present closely resembling those of typhoid fever, even to a rash and

changes in the urethra or bladder. In an abnormal, hyperemic or inflamed mucous membrane, the irritable terminal nerve-endings are far more responsive to stimulation than under normal conditions. If to this is added increased reflex irritability from impairment of the general health or neighboring hyperemia or inflammation we have the factors to account for the frequency and character of the inflammation. The causes given are only contributory by causing this hyperemia or inflammation of the deep urethra or sphincter. The reflex causes act by disturbing sleep, when there is pre-existing weakness at this point, so that the child, being in a semi-conscious state, responds mechanically to the desire to urinate.

SYMPTOMS.—Enuresis usually occurs at night, during the first sleep or toward morning. It is readily detected by the child's parents and is not likely to be confused with any other condition.

PROGNOSIS.—In young children the prognosis is favorable. It usually disappears spontaneously as the child grows older or may in most cases be cured if the cause can be discovered. Enuresis in older people is often incurable, being due to paralysis or serious disease of the urinary apparatus.

TREATMENT.—It is important to find the underlying cause. The digestive tract should be looked to, errors of diet corrected, dyspepsia, diarrhea or constipation cured, and intestinal worms removed if present. If there is a tight or adherent prepuce circumcision is indicated. Vulvitis or vaginitis should receive appropriate treatment with protargol (½ per cent) if gonorrheal, or bichlorid (1 to 15,000) if not. Keeping in mind the statement of Bierhoff concerning the etiology of the disease, it can be seen that inflammation or irritation of the genital tract provides foci from which infection may enter the urethra and set up the hyperemia or inflammation which really causes the disease. These parts should be kept clean.

In all cases the urine should be examined. Polyuria, if present, should be traced to its cause; if this is nephritis or diabetes the indications for treatment are apparent; if simple, the amount of fluid taken by the mouth is to be restricted. If there is cystitis with bacteriuria, urotropin is the best drug; it should be taken in doses suited to the age (5 to 10 grains two or three times daily for an adult). Acid urine demands an alkali;

citrate and acetate of potash are suitable preparations with which to reduce the acidity and dilute the urine. In subacute or chronic cystitis irrigation with boric acid solution (5 grains to the ounce) or if necessary instillation of a little nitrate of silver solution (1 to 5 grains to the ounce), followed by irrigation with boric acid or normal salt solution, may be advisable.

Calculi may require attention. Obstructions to respiration, such as enlarged tonsils, adenoids, etc., should be removed. Pelvic congestion, which may cause enuresis at the menstrual period, is relieved by the sitz bath.

Of the drugs used in the treatment of this condition the one considered the most generally valuable is belladonna or its alkaloid atropin. Children usually have considerable tolerance for this, and it may be given in relatively large doses. Commence with 5 to 10 drops of the tincture, or a dose suited to the age and gradually increase until the physiological results are obtained. Of the atropin give as follows:

Atropin sulphate ..... gr. 1
Water ..... oz. 1

Four to eight drops in water.

Among other drugs recommended are strychnin or nux vomica, which are especially valuable when there is weakness of the sphincter muscle, the bromids to quiet reflex irritability, ergot, antipyrin, camphor, rhus aromatica (sweet sumac), etc. These drugs are, as a rule, given empirically without very clear indications as to their use. Some of them are, however, undoubtedly of value. Below are common prescriptions:

Fluid ext. ergot ..... oz. 1½
Tinct. belladonna ..... dr. 2
Syrup tolu ..... oz. 2
Water, enough to make ..... oz. 8

Teaspoonful after each meal and before retiring. For child 10 years of age.—Kerr.

Tinct. iron chlorid ..... dr. 2
Fluid ext. ergot ..... dr. 5
Spt. chloroform ..... dr. 2
Tinct. quassia, enough to make ..... oz. 4

A teaspoonful in a wineglass of water three times a day. For children.—Potter.

Sweet sumac (rhus aromatica) has been used with excellent results. Before giving, the urine should be alkalinized with a

potassium citrate mixture—indeed, this should be used whenever the urine is highly acid. Five to twenty minims three times a day is the usual quantity of the sumac required. It may be prescribed as follows:

Fl. ext. rhus aromatica.....dr. 2½
Aromatic syrup .....oz. 1
Water .....oz. 3
Teaspoonful three times a day.

Tincture of cantharides in drop doses three times a day is useful in adults.

In treating these cases it is necessary to take into consideration the general health of the patient; this must be built up by nourishing, easily digested food, out-door exercise (always short of exhaustion), and medicinal tonics, such as iron, arsenic and strychnin. Harshness, whipping or threats only increase the trouble. It is better to treat these patients with consideration and cultivate in them the habit of self-control. Certain hygienic expedients are of value. These include the daily use of sitz baths; the restriction of fluids; teaching the child to lie upon the side (this may be done by tying a sash around the body, so that a large knot comes at the back), taking the pillow from under the head and raising the foot of the bed.

If all of these expedients fail, it is well to follow the plan of Bierhoff and make an endoscopic examination (if the child is old enough), and if an hyperemic or inflamed area is found to make direct applications to it of a quarter to a half per cent solution of nitrate of silver. In the female the entire urethral mucous membrane may be pencilled with this solution.

EPIDIDYMITIS—See Orchitis.

EPILEPSY.

DEFINITION.—A disease of the nervous system, characterized by sudden unconsciousness and usually accompanied by convulsions.

VARIETIES.—(1) Petit mal, in which the loss of consciousness is very brief, with no marked convulsion, although there may be muscular twitching; (2) grand mal, the usual form, with

prolonged unconsciousness and general convulsions; (3) Jacksonian or cortical epilepsy is not necessarily attended with loss of consciousness and the spasm is local. It is caused by disease or injury of the cortical layer of the brain.

ETIOLOGY.—The great predisposing cause of epilepsy is a nervous heredity. In practically all these cases there is a history of nervous diseases in other members of the family; the most common are epilepsy (said by Gowers to be present in two-thirds the cases) and insanity. Others are hysteria, paralysis, dementia, eclampsia, chorea, etc. The abuse of alcohol by the parents has a decided influence in its production. The majority of cases occur in early life generally before the twentieth year.

Exciting causes are injuries to the head, syphilis, indulgence in alcohol, nervous strain or shock, sexual excesses, masturbation, phimosis, sun-stroke, the acute infectious diseases, and auto-intoxication by the absorption of putrefactive toxins from the intestinal tract; dentition, worms, etc., by producing reflex convulsions in children, if long continued, may establish an epileptic condition. It has been suggested that the fits in nocturnal epilepsy are excited by a full bladder.

PATHOLOGY.—In cases of traumatic epilepsy a depressed fracture of the skull or injury to the cortex of the brain may supply the causative lesion. In other cases there may be tumors, syphilitic growths or disease of the membranes, but these are likely to give rise to localized phenomena, the so-called Jacksonian epilepsy. In true idiopathic epilepsy we still know but little concerning the cause. Pathological lesions are absent or at least have not yet been detected. Various theories have been proposed to explain the epileptic phenomena. Perhaps the most popular one is that the disease is due to a toxemia. The influence of the absorption of toxins from the intestinal tract upon the cortical brain cells has already been alluded to. Haig applied to its explanation his uric-acid hypothesis, stating that the retention of the uric acid in the blood produced the disease. Krainsky modified this theory by the conclusion that the irritant was a carbamate of ammonium. A still later theory is that of House, that the epileptic explosion of nerve force is due to pathological increase in the amount of cerebro-spinal fluid. Un-

fortunately these theories still rest upon a very unsound basis and it can not yet be demonstrated which is true and which false.

SYMPTOMS.—(1) *Petit mal.*—In this form of epilepsy there is temporary loss of consciousness. Generally the patient stops suddenly in the midst of his work or of conversation, the face becomes pale, the eyes assume a vacant stare and the pupils are dilated. Usually there are slight—never very pronounced—clonic spasms of the muscles of the face or hand. These may be noticed only upon close observation. There is never a generalized convulsion and the patient does not fall, except in rare instances. In a few seconds consciousness returns, the patient feels somewhat dazed, but soon takes up the thread of conversation as if nothing had happened—indeed, he is generally unaware of the loss of consciousness. If these attacks continue they are likely to increase in severity and terminate finally in grand mal, or the two forms may alternate.

(2) *Grand mal.*—This is the common form of the disease. The attack may come on suddenly, but in the majority of cases is preceded by an aura, although in not more than one-half of the cases is this long enough to be of practical value. This includes a variety of subjective sensations, usually the same in every case, so that the patient is conscious of the approach of an attack. He may suffer from melancholia, vertigo, dizziness, gastric distress or headache, sometimes lasting for several hours, or there may be sensory disturbances, as flashes of light, disturbances of sound, taste or of tactile sensibility (coldness, numbness and formication); the latter may commence in an extremity and pass rapidly upward and terminate in a paroxysm. In other cases there are strange mental images. These sensory symptoms are usually momentary and end in a spasm. In *procursive epilepsy* irrepressive muscular movements may replace this aura, the patient running about rapidly for a few moments or whirling on his toes.

In many cases the aura is entirely absent and the spasm comes without warning. This commences usually with a sharp cry (the epileptic cry), during which the patient falls to the ground, often seriously injuring himself thereby. He passes first into a tonic spasm, during which the lower extremities are rigidly

extended and the upper extremities flexed. The arms are bent at the elbows, the hands upon the wrists and the fingers tightly closed upon the palm. The head is retracted or drawn to one side. The spasm affects the respiratory muscles and as a consequence the patient becomes cyanotic and the face livid and swollen. This stage is immediately followed by one of clonic spasm in which muscular contraction is followed by relaxation. At first this is mild, rhythmical and vibratory, but it rapidly increases in intensity until the whole body is violently thrown about by the strength of the convulsion. The facial muscles take part in the spasmodic action and the features are distorted, the eyes roll and the lids are opened and shut. The contraction of the muscles of the mouth closes the jaw tightly and the tongue may be bitten. From between the teeth there issues a frothy saliva often tinged with blood. Frequently there is involuntary discharge of feces and urine. There is a slight elevation of temperature. After a minute or two the severity of the spasm gradually subsides and the patient passes into a condition of coma with stertorous breathing, merging into deep sleep lasting for two or three hours. After awaking he feels some muscular soreness and aching, or perhaps headache, but soon returns to his natural state.

These attacks usually recur with considerable regularity at longer or shorter intervals. There may be only two or three attacks in a year or they may be monthly, weekly, or even daily. Where they follow one another in rapid succession, without returning consciousness, as occasionally happens, an epileptic state (*status epilepticus*) is established, which is of the gravest portent.

(2) *Jacksonian epilepsy.*—This is symptomatic of some focal lesion of the brain or its membranes, as trauma, tumor, sclerosis, softening or meningeal inflammation. It is characterized by convulsion without loss of consciousness. The spasm always attacks one group of muscles first, usually commences at a certain point, as a finger or toe, and gradually extends to neighboring muscles. Frequently paralysis of these muscles follows the continuance of the epileptic phenomena, resulting from the extension of the morbid cerebral process.

Diagnosis.—The diagnosis of a typical case of grand mal

offers few difficulties, but in milder cases there may be some question. Petit mal may be mistaken for a fainting attack, but the history of recurrence, the absence of an exciting cause and the presence of spasms serves to fix the character of the disease.

The following table may be of value:

EPILEPSY.	UREMIA.	CEREBRAL HEMORRHAGE.	HYSTERIA.
No exciting cause. Sometimes preceded by sensory phenomena — the aura.	Insufficiency of the kidney. Preceded by vertigo, disturbances of vision, nausea and vomiting, and headache.	Often violent exercise; emotion. Sometimes preceded by mental irritability, muscular tingling and headache.	Emotional causes. Preceded by palpitation, choking, malaise, etc.
Onset sudden, preceded by epileptic cry.	Onset sudden, no cry.	Onset sudden. May be choking cry.	Often gradual, cry more likely to occur during course.
Pulse prior to attack usually slow.	Pulse at first strong, then weak and rapid; arterio-sclerosis.	Pulse slow and full, often arterio-sclerosis.	Pulse often rapid.
Pupils inactive or sluggish; often dilated.	Pupils generally dilated; albuminuric retinitis.	Pupils unequal or dilated.	Pupils normal.
Respiration slow, deep, often labored.	Respiration sharp, hissing and stertorous; often Cheyne-Stokes.	Respiration slow, puffing and stertorous.	Respiration not markedly abnormal.
No paralysis.	No paralysis.	Paralysis of one side.	No paralysis.
No odor.	Odor of urine on breath.	No odor.	No odor.
Convulsion general, first tonic then clonic; no opisthotonos.	Convulsion general; rarely unilateral; no opisthotonos.	Convulsion unilateral; no opisthotonos.	Struggling and tossing movement; opisthotonos.
Consciousness returns rapidly.	Coma deep after convulsions.	Continued unconsciousness.	No loss of consciousness.
No albumin in urine.	Albumin in urine.	No albumin in urine.	No albumin in urine.

PROGNOSIS.—The prospect of complete recovery is usually slight. Under the most favorable surroundings, as found in the

Craig Colony, there are, according to Spratling, only 5 or 6 per cent of cures among true idiopathic cases of the disease. When an exciting reflex cause can be found before the epileptic habit is established the hope of cure is greater. The older the patient and the longer the disease has existed the more unfavorable is the prognosis. Epileptics also suffer frequently from organic heart disease. An unfortunate common sequence is mental impairment. Life is not necessarily shortened.

TREATMENT.—It is of the utmost importance to ascertain the presence of any factors which might act as reflex causes of the disease. The whole body should be closely examined; the eruption of the teeth should be watched; disorders of the gastro-intestinal tract corrected; worms eliminated, if present; circumcision performed if there is phimosis; and the possibility of vicious habits, as masturbation, sexual excesses, alcoholism, syphilis and other causes taken into consideration.

Of late years considerable importance has been assigned to the effect of intestinal auto-intoxication in producing the disease. It is denied by authorities, like Spratling, that this causes a true epilepsy, but it is undoubtedly true that it may set in motion the vicious circle of habit and produce symptoms practically identical with those of so-called idiopathic epilepsy. The uric-acid theory of Haig has a similar basis, resting upon the hypothesis that the disease is a toxemia. The evidence is strong, whether we admit or deny the truth of these theories, that auto-intoxication plays an important part in the etiology of very many cases of this disease. This is an important indication for treatment. First, then, we should consider—

Hygiene and Diet.—The diet of the epileptic should embrace only easily digested food, taken regularly and sparingly, and should consist largely of milk, farinaceous foods, fruits and vegetables. Very little meat should be eaten, certainly not more than once daily, and alcohol, tobacco, tea and coffee are best entirely forbidden. These patients are too likely to eat heartily while denied the opportunity to dispose of food properly by the physical labor necessary for complete metabolism. Exercise is important and some congenial outdoor occupation, as gardening or farming, is best suited to occupy body and mind. Inglis tells of a case where complete cure was effected in a

young man of wealth by putting him to work in his own lumber yard, thereby establishing a proper equilibrium of food and waste. The education of the epileptic child should not be neglected. It should be taught habits of obedience and truthfulness and be given the mental training necessary to equip it for a life of usefulness, in special institutions for this purpose. A useful and congenial occupation or handicraft should be provided and encouragement given to pursue any taste for art or other avocation that does not call for excitement. Pleasant outdoor sports are good. In other words, an epileptic must lead a natural life and must not be allowed to think himself different from other people. Marriage should be discouraged. Hydrotherapy is of value. In vigorous patients, the cold sponge or shower bath followed by friction is valuable. Water should be drunk freely. Constipation should not be permitted. Usually this may be corrected by the use of laxative foods, but sometimes cathartics are necessary. In severe cases, thorough irrigation of the colon may be of decided value.

Decidedly the best results in the treatment of epilepsy are obtained in properly organized colonies, located in the country, where not only suitable employment for mind and body may be provided, but where patients may also have the benefit of a suitable hygienic regime, including regularity of habits, prohibition of stimulants and avoidance of excitement—enforced by a trained and skillful medical management. Wherever these colonies have been tried they have been very successful in reducing the number and severity of the attacks and in improving the health and increasing the self-respect of the patient. The Craig colony at Sonyea, New York, is the most notable institution of the kind in this country. Other states, as Pennsylvania, New Jersey, and Ohio, are taking up the work.

Medicinal Treatment—Attack.—When the aura is of sufficient length an effort should be made to abort the attack. If it precedes it by two hours or more a large dose of the selected bromid (40 to 60 grains) should be given. This is, however, seldom the case. Nitrite of amyl is the drug of greatest value during the aura; a pearl containing a few drops, crushed in a handkerchief, is the most convenient method of administering it. Sometimes the inhalation of chloroform or ether may be

justified. A number of other expedients have been tried for this purpose, including galvanism, taking snuff, cold applications to the spine and the use of a tight ligature around the limb in which the aura commences, as proposed by Hughlings Jackson.

Preparation should be made for possible injury from falling or on account of the violence of the spasm. The clothing should be loosened and to prevent biting the tongue, the corner of a folded towel or some convenient article, which is not so small as to be in danger of swallowing, should be placed between the teeth. Little can be done for the patient during the attack. In case the status epilepticus develops, nitrite of amyl inhalations should be tried, and if these fail chloroform or ether may be resorted to. Venesection is sometimes justified or the administration of croton oil in drop doses, to produce free purging.

Interval.—The bromids are the sheet-anchor of treatment in epilepsy. The potassium, sodium, ammonium, strontium and lithium salts are the ones most used, in the order named. Potassium bromid is generally believed to be the most powerful in its action, but sodium bromid has some decided advantages. It contains a larger percentage of bromin, is more soluble, less depressing to the heart and less likely to disarrange the stomach. The last-named qualities are of great importance in choosing a drug which must be taken for months and years. The ammonium salt is more stimulating, but causes even more gastric irritation than the potassium salt. Of late years strontium bromid has been much used and is warmly recommended by many authors. Its sedative action is well marked and it causes, it is claimed, slight, if any, disturbances of the gastric functions and does not impair the mind or produce anemia. The addition of 10 grains of borax to each dose is of benefit, unless its use causes a low form of gastritis with flatulence. The dose of the drug must be adapted to the needs of the individual patient. It should be a rule to keep a record of the number and severity of the fits and the influence produced upon these by the administration of the drug. It is well to commence with a small dose, as 10 grains two to four times a day, and increase this amount by 10 grains a day until the desired effect is secured or the physiological effects of the drug are produced. Usually doses of 60 grains

each may be considered the maximum, and 80 to 120 daily will be found sufficient for most cases. In some cases, however, it may be necessary to exceed this amount, and 3 or 4 or more drams may be taken daily in cases of special emergency. Excessive doses should not be long continued. The drug is most effective when given on an empty stomach, half an hour before or two hours after eating, but is less likely to produce gastric distress if taken directly after meals. It may be given in milk or in the alkaline mineral waters, as Vichy or Apollinaris, or in water alkalinized with sodium bicarbonate, where the price is an object. It should be well diluted.

Better results are usually obtained by so dividing the dosage that a larger quantity of the bromid is given some hours before the expected attack, when this can be predicted. If the attacks occur at night (nocturnal epilepsy) the larger dose should be given at bed time; if in the morning, the large dose should be given before arising. For instance, in a case of nocturnal epilepsy of moderate severity, 20 grains may be given in the forenoon and 40 grains at bed time.

One of the disagreeable results which follows the administration of large doses of the bromids is bromism. The drug produces vaso-motor depression, with a cold, clammy skin, and lowered temperature; it causes gastric distress, a fetid breath, coated tongue, drowsiness, forgetfulness, stupor, general mental dullness and acne. To prevent these symptoms it is necessary to stimulate elimination. The alkaline waters cause diuresis. The skin functions should be kept open by frequent bathing and an occasional saline should be taken to clean out the bowels. In children the rhubarb and soda mixture is good, acting not only as a laxative, but also as a gastric sedative and tonic. Arsenic in the form of Fowler's or Pearson's solution is used to prevent the acneiform eruption. It may be combined with the bromid (see Wood's prescription below). Féré states that the ill-effects of the bromid may be obviated by the use of intestinal antiseptics, as in the following:

Potassium bromid .....dr. 1½
Naphthol .....dr. 1
Sodium salicylate .....dr. ½
Make three doses. One dose three times a day.

Various combinations of the bromid salts are considered by some more effective than any one alone, and various other remedies are combined with them. Chloral decidedly aids the action of the bromid in some cases without resort to such large doses of the latter, but has the disadvantage of adding to the stupor; 10 to 20 grains may be used at a dose. Belladonna is also a useful antispasmodic. Iodid of potassium is frequently used, but is of doubtful value unless there is syphilis. Prescriptions of this class follow:

Potassium iodid	dr. 1
Potassium bromid	oz. 1
Ammonium bromid	dr. 2½
Potassium bicarbonate	gr. 40
Spirits chloroform	dr. 2
Infusion calumba	oz. 6

Two drams morning and noon and three drams at night, diminishing the quantity after convulsions cease, but continuing the remedy at intervals.—Brown-Sequard.

Sodium bromid	dr. 6
Potassium bromid	dr. 6
Fowler's solution	dr. 1
Tinct. calumba	oz. 3
Syr. ginger, enough to make	oz. 6

Dessertspoonful after meals and at bedtime.

—Bartholow.

Tinct. belladonna	m. 2
Sodium bromid	gr. 15
Chloral hydrate	gr. 5
Peppermint water, enough to make	dr. 1

One dose.—Vanderbilt Clinic.

Potassium bromid	gr. 10
Sodium bromid	gr. 10
Ammonium bromid	gr. 5
Sodium bicarb	gr. 2
Fowler's solution	m. 1
Water, enough to make	dr. 1

Dose, one teaspoonful.—Starr.

If the bromids control the spasms they should not then be discontinued, but should be given for two or three years after the last attack. Smaller doses may be given, 15 or 20 grains at bedtime will usually be found sufficient.

The coal tar antipyretic drugs have been used in epilepsy with

some excellent results, both alone and in combination with the bromids. Antipyrin is used by Wood in the following:

Ammonium bromid .....dr. 6
Antipyrin .....dr. 1
Fowler's solution .....dr. 1
Peppermint water, enough to make.....oz. 6
Tablespoonful in water night and morning.

Acetanilid (or phenacetin) is very highly recommended by Inglis. He finds it especially useful in the class of cases which the bromids fail to control or where these drugs have worn out their effect by long use.* A number of cases are reported by him in which complete cure resulted. He does not use it as a primary treatment, but first saturates the patient with bromid (preferably combined with chloral) in the usual way. The bromid is then stopped and the acetanilid commenced. In an adult 5 grains three times a day is an ample dose; frequently 3 grains proves sufficient, and if it acts nicely the dose may be gradually decreased. For the first eight or ten days the effect of the drug upon the heart should be watched.

G. Frank Lydston has used santonin in epilepsy. He does not claim permanent cures, but a marked control of convulsive attacks, and considers it far superior to the bromids. He begins with 2 to 5 grains and increases to about 20 grains three times a day. He watches the urinary secretion for evidences of overdose.

Another method of treatment which has given good results is that of Flechsig with opium. He commenced with $^5/_6$ grain of powdered opium or its extract, daily, in divided doses, and increased this amount by $^1/_6$ grain every day until 5 or 6 grains are taken daily, thereby thoroughly narcotising the patient. At the end of six weeks the opium is abruptly stopped and the patient put on bromids in large doses (1½ to 2 drams daily) to be continued for two months. This treatment has proven of greatest value in long-standing cases of an exaggerated type. It prevents the neural waste resulting from a long use of the bromids. The status epilepticus contraindicates its use.

Many other remedies have been used in this disease, but most of them are without special value. Borax (15 to 60 grains two or three times daily) probably has some merit, especially in noc-

turnal epilepsy. Where there is a weak heart, combinations of the bromids with digitalis are useful; digitalis is also useful in nocturnal epilepsy. Adonis vernalis is good in these cases; the dose of the tincture is 10 to 30 drops. Bechterew used it in the following:

Potassium bromid .....dr. 3
Infus. adonis vernalis.....oz. 4
Dist. water, enough to make.....oz. 6
Dessertspoonful three times a day.

Among other drugs which have been used are oxid of zinc, valerian, cannabis indica, trional, sulphonal, simulo and solanum Cariolinense. Simulo in large doses (½ oz. daily) is said to be useful in grand mal and solanum has been highly praised especially in the epilepsy of childhood. The dose of the fluid extract of the latter drug is 15 to 60 min. for an adult and proportionate doses for children.

In petit mal the bromids are less useful, although they are to be used. The drug of greatest value is probably nitroglycerin. It is usually given in doses of $^1/_{100}$ grain three times a day, but this may be gradually increased to $^1/_{50}$ or even $^1/_{25}$ grain or until the physiological effect of the drug is produced. Nitrite of amyl is *not* to be given in petit mal. Digitalis and belladonna are also of decided value in this form of the disease. Either of these may be combined with the bromids in suitable doses and a combination of this character seems to be more effective than either drug alone. Monobromated camphor is recommended by Bourneville. The dose is 1 to 5 grains; it is usually given in pill.

Surgical treatment may prove curative in Jacksonian epilepsy where the cortical lesion can be accurately localized by careful observation, during the attack, of the group or groups of muscles which are affected, provided the pathological changes in the brain are not irremediable by operative interference. Jonnesco and others have removed the cervical sympathetic ganglia for the cure of epilepsy and some cures have been reported. The evidence to the value of the operation is thus far fragmentary and incomplete and the same success has not attended it in this country.

EPISTAXIS; NOSEBLEED.

ETIOLOGY.—Nosebleed occurs as a symptom in many diseases. The causative factors present in these conditions may be grouped under the following heads, one or more of which will be found in every case: (1) Alteration in the character of the blood, with decreased coagulability, as in hemophilia; (2) weakness of the vascular walls; (3) increase of the blood pressure, either from active or passive hyperemia.

Among the diseases in which nosebleed occurs are the severe anemias, scurvy, purpura, typhoid fever, diphtheria, the acute contagious diseases, and chronic diseases of the heart, lungs, kidney and liver. It is the most common at or about the age of puberty and may replace menstruation wholly or in part (vicarious menstruation). Probably the most frequent cause is plethora or cerebral congestion. Serving to bring this about are excitement, overexertion, overheated and poorly ventilated rooms, inhalation of irritant gases and indulgence in stimulants. Local causes are (1) trauma, which may be due to a blow, "picking the nose," the presence of foreign bodies or of local irritants, as the inhalation of powerful gases, sneezing, blowing the nose, etc.; (2) erosion or ulceration of the mucous membrane or deeper tissues, which may be slight and superficial, or due to serious destructive diseases, such as syphilis or tuberculosis; (3) tumors, as polypi, sarcomata or carcinomata.

PATHOLOGY.—Generally there will be found considerable hyperemia of the mucous membrane, and as this is very rich in its blood supply it is easy for one of the small vessels to be ruptured by a blow or by a slight tear of the surface. Very often there is an eroded patch or ulcerative focus from which the blood starts upon slight provocation. This point is usually found upon the septum upon its anterior third or near the junction of the anterior and middle thirds. Less often it will be found farther back.

SYMPTOMS.—When due to cerebral congestion the nosebleed may be preceded by headache, ringing in the ears, throbbing of the temples, injection of the conjunctival vessels, flushing of the face, etc. These symptoms are relieved by the loss of blood. In many cases it commences suddenly, without premonitory symp-

toms of any kind. Usually the blood trickles from the nose drop by drop, but it may flow very rapidly. When the lesion is situated well back the blood falls into the pharynx if the head is held erect. It may be swallowed or gravitate into the larynx, and then be vomited or coughed up.

In "bleeders" the tendency to nosebleed is a dangerous one. The hemorrhages tend to recur, are very profuse and are checked with great difficulty, producing, if the loss of blood is great, anemia, faintness, vertigo and the other symptoms characteristic of hemorrhage.

PROGNOSIS.—Almost invariably good. In the anemic, aged and debilitated and in cases of hemophilia the loss of blood may produce alarming symptoms and occasionally result in death.

TREATMENT.—A great many simple expedients have been suggested for checking a simple nosebleed. First is position. The head should be kept erect, but not thrown back so far that the blood will find its way into the pharynx, and the patient should not be allowed to lie down unless weak. Collars or other constrictions around the neck or thorax should be loosened, and coughing, sneezing or blowing the nose avoided. Sometimes, simply closing the nostrils with the fingers will arrest the flow. Pressure upon the septal arteries or branches of the facial artery at the root of the nose or against the bone on either side of the alæ will constrict the vessels supplying the anterior portion of the nasal mucous membrane; it is therefore worthy of trial. Holding the arms extended above the head is another simple expedient. The application of cold, as ice, the ice-bag or cold compresses, to the back or sides of the neck or to the root of the nose often proves effective. Ice-water enemata or ice to the scrotum, groins or other sensitive portions of the body may produce a reflex vaso-motor spasm sufficient to check the bleeding. Or heat may be used for the same purpose as by plunging the feet or arms in water hot as can be borne.

Various substances may be injected into the nostril; the simplest are iced and hot water; salt-water, vinegar and lemon or lime juice are convenient household remedies and may be injected or applied on a cotton tampon. Cobwebs are filthy and often septic and should never be used. Of the astringents the favorites are alum and tannic or gallic acid in powder or

solution, Monsel's salt or an atomized spray of Monsel's solution (iron persulphate). Solutions of zinc sulphate, lead acetate or copper sulphate may be applied in the same way. Antipyrin has been found a valuable remedy either alone in a 5 or 10 per cent solution, or combined with the simple astringents:

Antipyrin .....dr. ½
Tannic acid .....dr. ½
Bismuth subnitrate .....dr. 1

Nothing is much better to check nosebleed temporarily than peroxid of hydrogen introduced into the nostril on a cotton pledget. Internal medication is rarely necessary. In the congestive form arterial sedatives, as aconite or veratrum viride in repeated doses until the physiological effects are produced, are beneficial. Quickly acting laxatives and a restricted diet are also generally indicated in these cases. Ergot, turpentine, hamamelis and oil of erigeron are occasionally used, but much less frequently than was formerly the case.

The importance of a careful inspection of the nasal cavities in every case of epistaxis is apparent. An effort should be made to find the bleeding point; when exactly located, it is much easier and more rational to apply an astringent or caustic to it directly than to cover any or every portion of the nasal mucosa with an irritating styptic. First cleanse the nostril with hot water, wipe it as dry as possible with a little cotton and apply a 2 to 4 per cent solution of cocain in order to constrict the tissues and locate the exact point of bleeding. Then touch it with the electrocautery, if at hand, or with nitrate of silver or chromic acid. Hydrogen peroxid or any of the milder styptics, already mentioned, applied directly to it, may do as well in mild cases. Richards recommends rubbing it thoroughly with compound tincture benzoin, repeated as opportunity offers. An excellent remedy which has recently been introduced is suprarenal gland. A 5 to 10 per cent solution applied on cotton will be found a powerful and usually effective astringent.

If, in spite of these measures, the bleeding continues, it will be necessary to tampon or plug the nostril. If the bleeding is not too far back, the plug may be introduced from the front. This may be done in various ways. A soft piece of cotton or linen, as an old handkerchief, or a piece of gauze, is introduced

into the nostril, umbrella fashion, and filled with absorbent cotton or wool, moistened with any convenient astringent, preferably an oily one, since this makes it easier to remove it without starting the bleeding again. Richards introduces long strips of iodoform gauze which have been soaked in hydrogen peroxid and oil made antiseptic by the addition of menthol, eucalyptus, thymol and camphor. One end of the gauze is carried with forceps far back into the nasal cavity and the whole nostril gradually filled. An ordinary condom makes a good plug. After introduction it may be filled with hot water from a fountain syringe. This may be tied off and retained for some time if desired. Pieces of dry compressed sponge trimmed to fit the nostril and introduced, swell as they are moistened by the escaping blood and make compression.

If the bleeding point is far back and hemorrhage is alarming it is necessary to block the posterior nares. Bellocq's canula has been specially designed for this purpose, but is seldom at hand. A soft rubber catheter will be found nearly as satisfactory. A string may be passed through it and out at the hole in its point. The catheter is then passed back into the nostril and when its point appears the string is grasped with forceps and a plug of cotton, cotton-wool or gauze tied to it. The catheter being removed the tampon is drawn snugly into place, assisted by a forefinger in the pharynx. Usually the plug is tied to the middle of the string and the free end brought out of the mouth and tied to the nasal end, but this is not necessary, since the plug can be easily dislodged with a probe. Instead of the catheter a doubled waxed string may be introduced or, as suggested by Gleason, a doubled strip of gauze may be pushed in with a probe until the loop appears in the throat. Absorbent cotton, plain or soaked in antipyrin or other styptic, is placed in this loop and drawn forward until tight. Sometimes both anterior and posterior plugs are required, the latter, of course, being applied first. Plugs should not be allowed to remain more than 24 to 36 hours. Great care should be taken in their removal in order not to dislodge clots and start bleeding anew. Soften with warm water and flush freely until every fold can be dislodged without resort to much force.

ERYSIPELAS; ST. ANTHONY'S FIRE; THE "ROSE."

DEFINITION.—An acute, contagious, inflammatory disease of the skin or mucous membrane, caused by a specific microbe and characterized by marked elevation of temperature.

ETIOLOGY.—Erysipelas is caused by infection with the streptococcus erysipelatis of Fehleisen. This germ is probably identical with the streptococcus pyogenes, although some investigators claim to find cultural differences. It doubtless finds its way into the skin or mucous membrane through some wound or abrasion. In the so-called idiopathic form of the disease this is very small and is not recognized by the naked eye. Stein has called attention to the fact that infection through the nasal mucosa may be responsible for these cases of facial erysipelas. Erysipelas is contagious, but not violently so; naturally, in the surgical wards of hospitals the tendency for the disease to spread is much more marked and it consequently requires careful quarantine. Parturient women are especially susceptible. No physician should go from attendance upon a case of erysipelas to a confinement. Epidemics occasionally occur. Age and sex seem to have little influence. Anders has shown that the disease is relatively more frequent in the spring, the most cases occurring in April, the least in August. Debilitated or cachectic conditions increase the liability to the disease; it occurs with relatively greater frequency in Bright's disease, alcoholism, syphilis, phthisis, etc. Recurrent attacks are quite common in those who have once had the disease.

PATHOLOGY.—The changes in the skin are those of an acute inflammation. There is hyperemia, with the throwing out of a serous exudate into the inter-cellular spaces. This fluid collects into vesicles and blebs. There is also a cellular infiltration. The seat of greatest intensity of the inflammation is at the circumference of the inflamed area. Here the lymph-vessels and surrounding tissues are found to contain the greatest number of streptococci and here the leukocytes are most numerous. The sharp line of demarcation between inflamed and sound skin is probably due to the accumulation of phagocytes at the periphery of the diseased area to resist the advance of the army of patho-

genic germs. In severe cases there may be degenerative changes in the viscera. Sometimes pyogenic abscesses or hemorrhagic infarcts are formed in the lungs, liver, kidneys or spleen. The inflammation may spread to the brain and cause meningeal inflammations, cerebral edema or thrombosis of the brain sinuses.

SYMPTOMS.—After an incubative period of two to seven days, during the last of which there may be such prodromal symptoms as headache, malaise, sore throat and slight feverishness, the active symptoms of the disease usually begin abruptly with a chill or chilliness, followed by fever. The temperature soon becomes moderately high, often reaching 103° to 105° F. in the first twenty-four hours. At the same time there is a corresponding increase in the rapidity of the pulse, which is generally full and of good strength. Other constitutional symptoms are headache, loss of appetite and coating of the tongue. Often there is nausea or vomiting and constipation. The urine is scanty and may contain a slight amount of albumin. The symptoms increase in severity until the third day, when the temperature may reach 106° or 107° F. After this it falls and may terminate by crisis at the end of the week. In severe cases and especially in patients accustomed to the use of alcohol there may be delirium, generally low in type, but sometimes maniacal. In prolonged cases the patient may develop a typhoid condition.

The disease may attack any portion of the body, but the inflammation in non-traumatic cases usually commences upon the nose, ear, eyelid, face or some other portion of the head—less commonly upon the body or extremities—as a small circumscribed, reddened area. This is hot, tender and painful, and rapidly increases in size, extending at its periphery, making a patch of irregular outline. This patch is swollen and elevated above the unaffected skin, as can readily be detected by passing the finger lightly over the surface, and is attended by sensations of itching and burning. The skin is a bright crimson color and presents a characteristic tense, glistening aspect. The line of demarcation between sound and diseased skin is well defined, although when the disease is advancing little red streaks and patches may be detected projecting into sound skin from the ridge of inflamed tissues. These rapidly coalesce.

As the disease progresses and the skin becomes more swollen and edematous, vesicles form which may become confluent forming large blebs containing usually a clear fluid; if these blebs become infected the contents is pustular. This swelling of the skin, if the face is attacked, causes great distortion of the features. The eyelids are often so edematous that the eyes are closed, while a sticky secretion gathers between the lids; the ears are enormously enlarged; the nose is broadened and blended with the swollen cheeks.

In favorable cases in four or five days the redness fades, the vesicles rupture or dry up and the upper layers of the skin desquamate. In very severe cases which terminate in recovery, especially where the deeper layers of the skin or subcutaneous tissues are effected, the symptoms subside more slowly; the bright red is exchanged for a dull, livid color, the edema lingers and the part pits upon pressure. The desquamating skin forms bloody scabs, or may even slough (phlegmonous erysipelas).

The duration of the disease is usually one to two weeks, but relapses are common; these tend to recur in the same localities. Sometimes the course of the disease is prolonged. This is likely to be the case in *erysipelas ambulans,* where the inflammation as it disappears at one place passes rapidly to another part of the body. These cases are prone to develop typhoid symptoms, including a dry, brown tongue, teeth covered with sordes, a rapid, feeble pulse, diarrhea, and mental stupor, possibly with low, muttering delirium.

COMPLICATIONS may occur, but are less common than generally believed. They are due, for the most part, to secondary infection, and include abscesses, articular rheumatism, pneumonia, pleurisy, nephritis, pericarditis, tonsillitis, etc. Falling of the hair is a common sequence of erysipelas of the scalp. Coley has called attention to the occasional curative effect of erysipelas upon sarcomatous growths.

DIAGNOSIS.—No great difficulty attends the diagnosis of this disease. It may be differentiated from erythema or eczema by the tense, shining skin, the well-defined line of demarcation and the high fever.

PROGNOSIS.—Usually good. In idiopathic erysipelas the mortality is 5 or 6 per cent. In young children, the aged and alco-

holic habitues the gravity of the prognosis is increased. It is peculiarly dangerous in puerperal women. Surgical erysipelas is more dangerous than idiopathic erysipelas.

TREATMENT.—*General.*—The patient should be placed in a well-ventilated, cool room and put upon a highly nutritious liquid diet. Milk, scraped beef, beef-juice, the malted milks, beef peptonoids, egg-nog, soft-boiled eggs, etc., are suitable foods. A preliminary cathartic dose of calomel, followed by a saline, should be administered at the beginning of treatment. It is important to maintain the patient's strength, and stimulants may be needed, such as whiskey, brandy, or champagne if the stomach is very irritable. Strychnin and digitalis may be required if there is cardiac asthenia.

For many years the tincture of chlorid of iron has been given as a specific for erysipelas. Its use is purely empirical, although it is asserted that it acts as an internal antiseptic. It undoubtedly has a favorable influence upon the disease in some cases. Large doses should not be given, since they may disturb digestion; 10 to 30 minims every three or four hours, well diluted in water, is a sufficient quantity. Quinin may be given with the iron or alone, in tonic doses (10 to 15 grains daily), especially if the temperature is high (103° F. or more). Da Costa introduced the use of pilocarpin. This is never to be used when there is debility and only at the beginning of an attack, in an effort to abort the disease; 1-6 to 1-8 grain is given hypodermically (not in the affected area) every three hours until free sweating is produced. In suitable cases it produces excellent results, but should be given with a stimulant, as strychnin, to counteract its depressing effect. Aconite is also used in small repeated doses at the beginning of an attack.

The use of Marmorek's antistreptococcus serum has not been attended with very favorable results, although there is a good deal of diversity of opinion as to its value.

The fever is best reduced by cold sponging of the skin and the use of the ice-cap to the head. The coal tar antipyretics are rarely required and should be entirely avoided unless the temperature is very high. Their use is absolutely contraindicated where there is any weakness of the heart.

For the nervous symptoms, such as pain, insomnia and delir-

ium, sedatives are required. Anders recommends hypodermics of hyoscin hydrobromate (1-100 grain) when the strength is good. Restlessness and insomnia are often relieved by sodium or potassium bromid. Or sulfonal or trional (15 to 30 grains of either) may be used. Codein (½ grain) is a good sedative and relieves the pain. In severe cases hypodermics of morphin and atropin may be necessary. The following may be useful:

Morphin sulphate .....gr. 4
Sodium bromid .....dr. 5
Tinct. cannabis indica.....dr. 4
Tinct. chloroform .....dr. 2
Syrup orange .....oz. 2
Peppermint water, enough to make.....oz. 4
Teaspoonful every two to four hours.

A prescription recommended by MacLachlan, where there is cardiac weakness and pain, is a pill containing—

Powdered opium .....gr. 1
Quinin sulph.....gr. 1
Powdered digitalis .....gr. ¼
One pill. To be taken every two to four hours.

Local Treatment.—A great variety of lotions and ointments are used locally. These protect the skin from the air, decrease the danger of mixed infection, and allay the disagreeable subjective symptoms. It is doubtful if any of them exert a very powerful influence upon the course of the disease. Cold is distinctly useful and its simplest application—and an excellent one—consists of frequently changed compresses wrung out of iced-water. Lead-water with laudanum is one of the most useful applications for erysipelas and may be applied cold, in the same manner, upon strips of gauze or lint. Its formula is as follows:

Solution lead subacetate.....dr. 1—2
Tinct. opium .....oz. ½—1
Distilled water, enough to make.....oz. 8

Lead acetate (sugar of lead) may be used in this preparation instead of the subacetate, in the proportion of about a dram to the pint.

Other lotions which may be used with benefit are a saturated watery solution of boric acid, sodium hyposulphite (1 dram to the ounce), carbolic acid (1 to 40), bichlorid of mercury (1 to

1000) and pure alcohol. A good method of local treatment is that proposed by Da Costa. He paints the affected area and the adjacent skin daily with a mixture of equal parts of alcohol and tincture iodin. The part is then covered with lint kept moistened with lead-water and laudanum. J. C. White applies the following:

Carbolic acid	dr. ½—2
Alcohol	oz. 4
Water	oz. 4

Apply on lint every alternate hour.

In mild cases dusting powders may be employed. Those most commonly used are borated or salicylated talcum, zinc oxid, starch and bismuth subnitrate. Of the ointments and oily preparations, the simplest are 10 per cent carbolized vaselin or olive oil and zinc ointment. White lead paint is an old and favorite remedy.

But to-day probably the favorite remedy for local use in erysipelas is ichthyol. This is usually applied in an ointment (25 to 50 per cent) with lanolin:

Ichthyol	dr. 2—4
Lanolin	dr. 4

A thick layer of this is to be spread upon the diseased and adjacent surface and covered with lint. In facial erysipelas it is a good plan to mold the lint into the form of a mask, leaving openings for the eyes and mouth. An excellent way to apply this remedy is that recommended by Von Nussbaum. The skin is first carefully cleansed with castile soap and then bichlorid of mercury solution (1 to 1000) is applied. After drying, a thick coating of the ichthyol ointment (50 per cent) is applied and covered with a gauze dressing, held in place by adhesive strips or a bandage.

With a view to preventing the spread of the disease, it was formerly the fashion to paint the elevated ridge of advancing inflammation and the adjacent healthy skin with a strong solution of nitrate of silver or to pencil it with the solid stick. This probably has no influence upon the course of the disease. Collodion has been employed for a similar purpose. Perhaps by constricting the underlying vessels it may produce good results.

It is claimed by Debrett that the disease can be aborted by the following or similar preparations:

Ichthyol .....dr. 2½
Flex. collodion .....oz. 1½

Paint upon the surface, beginning about one inch beyond the line of demarcation between healthy and inflamed skin.

Unna applies the following mixture:

Ichthyol .....dr. 1
Ether .....dr. 1
Flex. collodion .....dr. 2

When the inflammation extends deeply into the tissues or is very severe, multiple scarification and the application of bichlorid solution (1 to 2000) sometimes gives brilliant results, since it brings the antiseptic into contact with many of the streptococci, which are located superficially. Along this line is the method of treatment proposed by Hueter, consisting of injections, subcutaneously, of a 3 to 5 per cent solution of carbolic acid. Bichlorid of mercury solution (1 to 4000) is used in the same way. These injections are made at the peripheral zone of the lesion with the hope of checking the progress of the disease. They are painful and should be reserved for severe cases only.

When there is a wound of the skin which is the focus of inflammation, as in surgical erysipelas, it should be thoroughly irrigated with bichlorid solution (1 to 1000) and dressed antiseptically.

ERYTHEMA INTERTRIGO; CHAFING.

DEFINITION.—Hyperemia of the skin caused by friction between contiguous surfaces.

ETIOLOGY.—It is most frequent in children and in the obese. The localities which suffer most are the thighs, buttocks, genitalia, mammæ and neck—in fact, wherever there are contiguous surfaces or folds of skin rubbing against each other. Retained secretions from lack of perfect cleanliness, too vigorous friction of the skin and the use of strong alkaline soaps act as exciting causes. Indigestion is a predisposing factor.

SYMPTOMS.—The reddened appearance and hot, tender sensi-

tive surface of a chafed area of the skin requires no description.

TREATMENT.—The surface should be carefully cleansed with castile or some other perfectly bland soap and warm water in order to remove any irritant secretions. A simple lotion of boric acid and rosewater (10 grains to the ounce) may be applied; the skin is then carefully dried, the adjacent surfaces protected from contact or friction by the use of cotton or lint, and a liberal amount of dusting powder used. Borated talcum powder, starch or lycopodium will be found suitable and effective.

ERYTHEMA MULTIFORME.

DEFINITION.—An acute inflammatory disease of the skin characterized by an eruption which varies greatly in extent and type and includes erythematous, papular, tubercular, vesicular and bullous lesions.

ETIOLOGY.—The disease occurs most frequently in the fall and spring, in young adults and in women more often than in men. Its etiology is obscure, but rheumatism, gout and digestive disturbances seem to have an influence in its production. Intestinal toxemia is, according to Stellwagon, undoubtedly a factor in some cases.

PATHOLOGY.—The skin changes are due to a primary hyperemia, followed by inflammation usually of a low grade, during which a serous exudate is thrown out into the tissues. It is in many respects like urticaria and is probably caused by a vasomotor neurosis.

SYMPTOMS.—The eruption, as implied by the name, assumes a great diversity of forms. Each variety receives a special designation, according to the predominating lesion. The papular form, or erythema multiforme papulosum, is the most common. In the tubercular form the lesion is somewhat larger than in the papular. The vesicular or bullous forms depend upon the presence of vesicles or bullæ.

At first the lesions are bright red or violet, but later become darker in color, taking on the black to bluish shades characteristic of an ordinary bruise. They may remain discrete or coalesce,

are nearly free from itching and cause little burning. They generally come out in crops, last a few weeks and gradually disappear. Any portion of the body may be attacked, but the lesions are most frequently noted upon the backs of the hands and feet, the forearms and legs; next in frequency they occur upon the neck, head and trunk, lastly upon the abdomen and back. Accompanying the disease there is more or less systemic disturbance, including slight fever, malaise, headache and rheumatic pains.

According to the shape of the lesion, various names are applied. When it is circular with a clearing center it is called erythema circinatum or annulare.

Erythema iris is a multiple circular lesion consisting of several rings inflamed at the periphery. It is most common upon the hands and feet. It often has along its border concentric rings of vesicles (herpes iris) It is characterized by a play of colors in the different rings.

Erythema gyratum or figuratum is due to the fusing of two or more circular patches.

DIAGNOSIS.—In eczema there is a more severe inflammation, pronounced itching and burning, greater exudation, a tendency to the formation of crusts and chronicity.

In urticaria the lesions are lighter in color, temporary and often evanescent.

In dermatitis herpetiformis the lesions tend to cluster, are not symmetrical, are characterized by marked itching and usually run a chronic course.

In ringworm the edges are well defined and advance slowly. The lesion is not symmetrical and is very persistent.

PROGNOSIS.—Almost invariably ends in recovery in a few weeks. Deaths have been reported.

TREATMENT.—The treatment is largely symptomatic. If there is digestive disturbance it should be corrected. Salines are indicated if there is constipation. Salol and other intestinal antiseptics may be required. If there is debility, quinin, iron and strychnin will be useful. Rheumatic pains are benefited by salicylate of sodium, acetanalid or phenacetin. Locally soothing lotions may be employed as in erythema simplex.

ERYTHEMA NODOSUM.

DEFINITION.—An inflammatory skin disease characterized by the formation of a number of circular or oval swellings or nodes.

ETIOLOGY.—It is most common in children and occurs most often in individuals subject to rheumatism or diseases having a similar cause, such as chorea and tonsillitis. Digestive disturbances also stand in a causative relation.

PATHOLOGY.—There is marked hyperemia, with serous exudate and some cellular infiltration into the skin and subcutaneous tissues, making a rounded, elevated, circumscribed swelling.

SYMPTOMS.—The general symptoms resemble those of erythema multiforme. The eruption usually appears suddenly, with some febrile disturbance, headache, malaise and rheumatic pains in the joints. It consists of large, rounded or oval, elevated nodules. They are tender, at first bright red in color, later becoming bluish or black, closely resembling in the terminal stage the discolored surface of an old bruise. They are tense to the touch and shiny in appearance during the acute stage, but later become soft and give the sensation of fluctuation as if there were pus, but suppuration never occurs. Rarely there may be hemorrhage. These nodes are single or multiple, varying in number, as a rule, from five to twenty. They are usually situated upon the extensor surfaces of the legs, below the knees; less often upon the forearms and rarely upon other portions of the body.

DIAGNOSIS.—The disease may be confused with bruises. These are more likely to be single, and lack the marked nodular form. In bruises there is a history of injury, which is absent in erythema nodosum. Syphilitic gumma lack the inflammatory symptoms and are much more chronic.

PROGNOSIS.—The disease ends in recovery in a few weeks.

TREATMENT.—Considering the rheumatic history of these patients the drug to be given in most cases is sodium salicylate. This is to be given in full doses in order to secure its systemic effects. Rest and elevation of the limbs are quite important. Internally general tonics, such as quinin, iron and strychnin, are

often valuable. Stellwagon recommends intestinal antiseptics. Locally lead water and laudanum, boric acid solutions and similar preparations may be used to allay the inflammation.

ERYTHEMA SIMPLEX.

DEFINITION.—An hyperemia of the skin, characterized by the appearance of reddened patches of various sizes and shapes.

ETIOLOGY.—Simple erythema may be caused by exposure to heat or cold, the rays of the sun (sunburn), to slight injuries and to local irritants, such as mustard, capsicum, liniments, various dye-stuffs, etc. It may be symptomatic of systemic disorders, especially those of the gastro-intestinal tract.

SYMPTOMS.—The eruption consists of a simple diffuse redness, not elevated above the surface, without infiltration, disappearing upon pressure and associated with no constitutional symptoms. There may be some local heat or burning. When due to a local cause the patch is correspondingly localized. In symptomatic erythema it is more or less generalized.

TREATMENT.—Little treatment is required. The rash usually disappears upon the removal of the cause. If there is digestive disturbance, a quickly acting laxative, as a saline or castor oil, will often be all that is necessary. A simple dusting powder, as talc, starch or zinc oxid, or a soothing lotion, like the following, may add to the comfort:

Boric acid	gr. 40
Carbolic acid	gr. 10
Glycerin	dr. 2
Rose water, enough to make	oz. 4

FACIAL PARALYSIS; BELL'S PALSY.

DEFINITION.—Paralysis of the face, nearly always unilateral.

ETIOLOGY AND PATHOLOGY.—It is caused by impairment or destruction of the function of the seventh or facial nerve. This may be due (1) to a lesion of the cortical center of the nerve in the central convolution of the cerebrum; this lesion may be a tumor, hemorrhage, embolism, meningitis or a trauma. Paralysis from this cause is called supranuclear paralysis. (2) The paralysis may be due to some disease of the nucleus, such as a tumor, softening, hemorrhage or the absorption of toxins, as in

diphtheria. This is called nuclear paralysis and is infrequent. (3) It may be caused by a peripheral neuritis which may be set up by compression of the nerve in the petrous portion of the temporal bone, by fracture or by extension of middle ear inflammation. Most frequently it is caused by exposure to the cold, as from riding in the wind or sitting in a draft. Rheumatism is given as a cause of this form. It is called infranuclear paralysis and is the usual type of the disease.

SYMPTOMS.—The symptoms vary somewhat according to the location of the lesion, but the following are the most characteristic: The paralysis usually appears suddenly without marked subjective symptoms. Upon examination one side of the face is found to be paralyzed and by the contraction of the unaffected muscles it is drawn toward the sound side. There is loss of expression; the natural wrinkles and folds of the face are obliterated upon the affected side; the corner of the mouth is dropped and saliva dribbles from it; the eyelid upon the affected side cannot be closed, is watery, and, tactile sensation in it being interfered with, conjunctivitis may develop. The paralytic symptoms are exaggerated by attempts at laughing, singing or whistling; these are found to be impossible. The forehead cannot be wrinkled. When eating, food collects within the cheek and swallowing is seriously interfered with. The tongue seems to be directed toward the paralyzed side, but in reality is central; this may be seen by noticing its relation to the teeth.

Location.—Other symptoms are dependent upon the location of the lesion. Those given above are the prominent ones in the usual form, which is due to a peripheral neuritis.

If the affected point is a little higher in the course of the nerve, above the exit of the chorda tympani there will be a decreased secretion of saliva and loss of taste upon the anterior portion of the tongue.

If it is still more central, above the auditory supply to the stapedius, there is in addition hypersensitiveness of hearing and paresis of the soft palate.

If above the geniculate ganglion, taste is not affected, but there is the same facial paralysis, decreased salivary secretion, acuteness of hearing and perhaps paresis of the soft palate.

If the lesion is in the Fallopian canal there may also be

involvement of the auditory nerve, which is in close proximity, with affected hearing. Palate and taste are normal.

In central lesions the upper portion of the face is not so much affected as the lower. The muscles of the forehead and eyelid are not paralyzed.

PROGNOSIS.—In the ordinary form, due to peripheral neuritis, the prognosis is good. Recovery usually takes place within a few weeks. When the condition is due to central lesions the prognosis is dependent upon the cause.

TREATMENT.—Treat the cause. Disease of the middle ear should have appropriate treatment. Syphilis demands mercury or potassium iodid. Fractures or injuries of the head should be treated upon surgical lines.

When due to cold or rheumatism, and the disease is local rather than central, counter-irritation may be practiced with benefit. Hot fomentations are used and in severe cases blisters behind the ear. Laxatives and the alkaline diuretics are generally prescribed and, if there is rheumatism, the salicylates. For the paralysis massage and a weak galvanic current are most useful. Local injections of strychnin sulphate every day or every other day are recommended.

FAVUS.

DEFINITION.—A contagious parasitic disease of the skin, usually affecting the scalp.

ETIOLOGY AND PATHOLOGY.—It is caused by a fungus, the achorion Schonleinii, which is communicated by contact. It is not uncommon in cats and mice and these animals are undoubtedly responsible, in many cases, for its transmission. The disease is contagious, but is rather uncommon except among the foreign-born poor.

This fungus grows upon the epidermis, mainly about the roots of the hair and the hair follicles; it may penetrate into the hair itself so as to completely obliterate its normal structure. In growing it forms a characteristic crust which consists almost entirely of flattened, thread-like tubes, empty or containing spores. In microscopic appearance the fungus is very much like ringworm, but its mode of growth is essentially different.

SYMPTOMS.—The disease usually appears upon the scalp, but may attack any portion of the body, including the nails. It appears first as a superficial inflammation about the hair follicles. Upon examination, small yellowish crusts are found, characteristically cup-shaped in appearance, their centers being depressed and their borders elevated above the surrounding skin. This is the favus-cup or scutulum, consisting almost entirely of fungus elements. These scutula, when removed, leave an inflamed concave depression in the scalp. They vary in size from a pinhead to a pea.

These fungus growths are at first discrete, but later usually become confluent, forming thick scales. There is a characteristic mousy or damp straw odor. The hair cylinders are involved, become dry, brittle and lusterless and break off easily; their color fades and they finally fall out. The loss of hair is due to the pressure of the scutulum upon the hair follicles and the formation of scar tissue; if the disease continues the result may be extensive areas of permanent baldness.

On non-hairy portions of the body the scutula are usually characteristic if present, but are often found with difficulty, the disease presenting the appearance of an ordinary dermatitis. With comparative rarity the nails are affected, either the matrix or nail proper being attacked by the fungus. In this locality the disease is extremely chronic and may require a radical operation for its cure.

DIAGNOSIS.—This is generally easy if the characteristic features of the disease are kept in mind. These are, the yellow cup-shaped scales, the mousy or damp straw odor and the extensive invasion of the hair cylinder by the fungus as seen under the microscope.

PROGNOSIS.—The disease upon the scalp resists treatment for months and is arrested with difficulty. If it continues it causes atrophy of the hair follicles, cicatricial contraction and permanent baldness. Upon the body it usually yields readily to treatment.

TREATMENT.—In order to be effective the diseased hairs must be extracted. The hair should be cut short, the crusts removed as far as possible by soaking in oil and washing with soap and water. This may need to be repeated several times before it is

effective. The surface should then be gone over carefully, the diseased hairs seized with small forceps and quickly extracted, in this way entirely denuding an affected patch. This brings away the fungus adhering to the root and leaves the follicle open for the action of the parasiticide which must now be applied. Many drugs are recommended for this purpose. The favorites are corrosive sublimate, ½ to 4 grains to the ounce of alcohol and water; sulphurous acid, pure or diluted; carbolic acid, one part to three or more of glycerin; citrine and other mercurial ointments; 10 to 20 per cent oleate of mercury and ointments of tar and sulphur. Stellwagon recommends—

Precip. sulphur	dr. 2
Green soap	dr. 1
Oil cade	dr. 1
Benz. lard	oz. ½

Chrysarobin is a very valuable preparation, but must be used with care. An ointment (5 to 10 per cent) is the method of application. Walker recommends an ointment made with ordinary copper sulphate, a dram to the ounce. Similar is the oleate of copper recommended by Shoemaker, to be used in a 10 to 20 per cent ointment. This author has also found the following serviceable:

Potassium bichromate	gr. 15
Benzoated lard	oz. 1

Whatever treatment is selected, it must be persisted in for months and must be continued after all evidences of the disease have disappeared, on account of the danger of recurrence.

FRECKLES; LENTIGO; EPHELIS.

Definition.—Small pigmented spots occurring upon exposed portions of the skin.

Etiology and Pathology.—Freckles are due to the deposit of an increased quantity of pigment in small circumscribed areas of the epidermis and are caused by exposure to strong sunlight. People having light complexions, and especially those with red hair, are most susceptible to the affection. It is more common and more pronounced during youth and adolescence.

SYMPTOMS.—The yellowish to brownish maculations of the skin, known as freckles, are so common as to need no description. They occur principally upon the face, neck and backs of the hands, which are exposed to the actinic rays of the sun. Very rarely they are found upon protected portions of the body, probably as a result of some defect of innervation. Freckles usually appear during the summer months and fade during the winter, but may persist the year around.

PROGNOSIS.—Freckles yield quite readily to treatment, but quickly return upon exposure to the sun's rays.

TREATMENT.—The only way for susceptible persons to avoid freckles is to protect the skin. Veils may be worn, preferably of colors that will collect the actinic rays, as red, yellow or brown. The hands may be covered with gloves. Many applications have been recommended for the removal of freckles. The simplest and a popular household remedy is lemon juice; the most popular with the profession is corrosive sublimate (1 to 4 grains to the ounce). Practically all remedies used for this purpose act by causing exfoliation of the epidermal layer. Other remedies used are ammoniated mercury, salicylic acid, resorcin, the bismuth salts, lactic acid, acetic acid, boric acid, sodium borate, potassium carbonate, etc. The following prescriptions illustrate their use. In employing them it is necessary to remember that their strength should be varied, in order to produce slight cutaneous irritation with desquamation. When this irritation becomes plainly apparent their use should be discontinued for a few days, during which cold cream or a soothing lotion may be applied. The remedy may then be continued if necessary.

Mercury bichlorid	gr. 6
Dilute acetic acid	dr. 2
Sodium borate	gr. 40
Rose water	oz. 4

Apply night and morning, at first gently, then vigorously. —Bulkley.

Mercuric chlorid	gr ½
Tincture benzoin	dr. 2½
Glycerin	dr. 2
Rose water, enough to make	oz. 6

Use as a lotion to affected spots.—Shoemaker.

Sodium borate .....dr. 2
Potassium chlorate .....dr. 1
Glycerin .....oz. ½
Alcohol .....dr. 2
Rose water, enough to make.....oz. 6
Apply with a sponge several times a day.—Rohe.

Potassium carbonate .....dr. 3
Sodium chlorid .....dr. 2
Orange flower water .....oz. 2
Rose water, enough to make.....oz. 8
Use night and morning.—Bartholow.

Unna recommends the following prescription:

Bismuth oxid .....gr. 30
Powd. starch .....gr. 30
Kaolin .....dr. 1
Glycerin .....dr. 2
Rose water, enough to make.....oz. 2
Paint on spots and allow to dry, washing the drug off before making a new application.

An ointment recommended by Unna is:

Bismuth chlorid .....gr. 5—30
Mercury bichlorid .....gr. 1
Hydrogen peroxid .....oz. ½
Lanolin .....dr. 1
Vaselin .....dr. 2

Another formula much in use with slight variations is:

Ammoniated mercury .....dr. 1
Bismuth subnitrate .....dr. 1
Glycerite of starch .....oz. 4
Apply every second day.

When heroic treatment is desired and the patient can be confined to the house for a few days, the skin may be thoroughly shelled by the use of equal parts of resorcin and Unna's zinc paste:

Resorcin .....oz. 1
Zinc paste (Unna).....oz. 1
To be thickly spread upon the face twice daily for three or four days.

A bland ointment is then applied and in a day or two more the skin desquamates in large flakes. The formula of the zinc paste is as follows:

Silicated earth .....gr. 20
Zinc oxid .....dr. 2
Benz. lard .....oz. 1
—Walker.

Touching each freckle with an electric needle and using a weak galvanic current is said to give satisfactory results.

GALL STONES—See Cholelithiasis.

GASTRIC CANCER.

ETIOLOGY.—Next to the uterus the stomach is the part of the body most frequently attacked by cancer. In a series of more than 30,000 cases investigated by Welch, more than 20 per cent occurred in this locality. The disease is often hereditary. Most cases occur between the fortieth and seventieth years, but it sometimes attacks young adults. Preceding ulcer of the stomach is an undoubted etiologic factor in producing the disease. The cause of cancer is still undetermined, but the evidence is accumulating that it is due to infection, probably with protozoa.

PATHOLOGY.—The varieties of cancer found in the stomach include the epithelial (columnar and squamous), medullary or soft, scirrhus or hard, colloid and melanotic. In 60 per cent of the cases the pyloric region is attacked; next in frequency is the lesser curvature. The greater curvature and cardia are less often affected. The squamous epithelial cancer occurs only in the last named region. The stomach is usually dilated, though in the medullary form it may be contracted. In this form there may be extensive ulceration and sometimes perforation. Cancer of the stomach is usually primary, but it may also be secondary to disease in other parts.

SYMPTOMS.—The disease usually begins slowly and insidiously with dyspeptic symptoms, including loss of appetite, discomfort in the gastric region, eructations, sometimes vomiting, constipation and pain. Pain is a prominent symptom throughout the course of the disease and is usually constant and localized, though it may be referred to the shoulder blade or back. There is tenderness over the affected area.

Emaciation commences early and is soon followed by a characteristic waxy pallor or cachexia. Finally, if the cancer is in the

pyloric region, a tumor may be felt. If it is in the cardiac region or the greater curvature it may be beyond the reach of the palpating finger. Vomiting is a prominent symptom after the disease has become well established. It is often periodic, the vomitus being large in quantity and grumous from mixture with partially digested blood, giving it a "coffee-ground" appearance. There is leukocytosis.

Examination of the stomach contents usually shows absence of HCl and an increased quantity of lactic acid. The Oppler-Boas bacillus is found in most cases. It is a long thread-like organism requiring lactic acid for its development and disappearing in the presence of HCl.

Late in the disease there is edema of the ankles and feet, often some fever, chills and sweating, profound depression and severe pain, and finally death.

PROGNOSIS.—Cancer of the stomach is invariably fatal. The course of the disease is one to three years.

DIAGNOSIS.—Cancer of the stomach is most likely to be confused with chronic gastritis. A study of the differential table given in the description of that disease will help to recall the differences.

Tumors in the neighboring regions may cause some difficulty, but these will usually be cleared up by an examination of the contents of the stomach.

TREATMENT.—The treatment aims only to add to the comfort of the patient. It can do little more. The food should be suited to the digestive possibilities of the patient and to his known likes and dislikes. In many cases it is necessary to predigest it and in advanced cases the patient must be given food by the rectum. Pain requires the use of morphin at some stage of the disease. Other symptoms must be treated as they arise on general principles. A surgical operation may offer hope.

GASTRIC DILATION; GASTRECTASIS.

DEFINITION.—When there is any increase in the normal capacity of the stomach the condition is known as gastric dilation or gastrectasis.

ETIOLOGY AND PATHOLOGY.—One or both of the following factors is necessary for the production of dilation of the stom-

ach: (1) Obstruction at the pyloric outlet; and (2) weakness of its muscular walls. Pyloric obstruction may be caused by the growth of malignant or other tumors, the contraction of the scar tissue formed in gastric ulcer, the pressure of tumors or peritoneal adhesions outside the stomach, or twists or loops in the organ produced by tight lacing. It may also be spasmodic, especially if there is an ulcer near the pylorus; the outpouring of hydrochloric acid when food is taken is likely to excite firm muscular contraction in such cases. In pyloric stenosis there is first a compensatory thickening of the muscular walls, finally succeeded by muscular exhaustion and atrophy.

Dilation of the stomach may result from muscular weakness. Probably the most common cause of this is overloading of the stomach with food or drinking excessive quantities of liquids. Chronic gastric catarrh may produce myasthenia, which will be further increased by the stagnation of food and the distention produced by the accumulation of gases. Degeneration of the muscles in the chronic debilitating diseases favors its occurrence.

SYMPTOMS.—The symptoms depend somewhat upon the cause. For instance, if the dilation is due to cancer of the stomach they would differ decidedly from those found in cases in which pyloric spasm or overeating was the cause. The tongue is coated, the breath is foul and the appetite fitful. In some cases there is complete anorexia; in others, the appetite is increased and the patient suffers greatly from thirst. There are frequent eructations of foul smelling gas, and occasional regurgitation of sour fluid. A characteristic symptom in advanced cases is the vomiting. For several days the patient suffers increasing distress after eating, the sensation being one of weight and distention. An attack of vomiting which comes on perhaps in the night gives him entire or partial relief, according as the stomach is entirely emptied or not. These attacks recur every two or three days. The quantity ejected is sometimes enormous. The vomitus consists of an acid, fermenting fluid of disgusting odor and separates into three layers, the lower containing fragments of food, the middle consisting of a brownish fluid, covered with turbid froth. It contains sarcinae and other organisms. Constipation is usually marked on ac-

count of the small amount of food reaching the intestines. The quantity of urine is reduced and the urea and chlorids are diminished.

The general health of the patient is affected. There is usually progressive emaciation. This is, of course, much more marked if the condition is caused by a serious disease. Complications include palpitation and irregularity of the heart, asthmatic seizures, tetany, globus hystericus, etc.

PHYSICAL SIGNS.—Inspection sometimes reveals the outlines of a distended, dilated stomach. These are seen more clearly by giving the patient a Seidlitz powder, each paper being taken separately. A splashing of fluids may usually be recognized by palpation. Percussion locates the boundaries of an enlarged stomach. The organ may be distended with gas evolved from a Seidlitz powder or with air. Or its lower border may be outlined by percussing over it after the patient has drunk one or more glasses of water. Auscultation shows the presence of splashing sounds. These may be audible to the patient.

DIAGNOSIS.—The diagnosis depends upon a recognition of the physical signs. As aids, the introduction of a flexible sound or Turck's gyromele, which may be felt through the external abdominal wall, will be found of decided assistance in outlining the boundaries of the stomach. Or its size may be determined by transillumination with Einhorn's gastrodiaphane or examination with the X-Ray after administration of bismuth subnitrate to cover its interior wall. Motor insufficiency will be shown by the salol test. Normally salicyluric acid appears in the urine in one-half to one hour after it is taken; in dilation it requires two or three hours.

PROGNOSIS.—This depends upon the cause. If the condition is due to carcinoma the case is of course nearly always hopeless. If there is advanced gastric catarrh with atrophy of the mucous glands, a cure cannot be expected but it is possible to benefit the patient. Pyloric stenosis may sometimes be relieved by surgical procedures.

TREATMENT.—The treatment should be adjusted to suit the cause. In the majority of cases, there is an associated gastric catarrh with reduced secretion of hydrochloric acid; but sometimes there is hyperacidity, and there may be ulceration. The

methods to be followed in these conditions are discussed under their proper heads.

Diet.—The character of the food to be given may be determined after a test meal. HCl in excess requires a meat or proteid diet and neutralization of excessive acidity with alkalies, as sodium bicarbonate or Vichy water. Deficient hydrochloric acid permits of more carbohydrates and less proteid food, but excludes fermentable substances of all kinds. *It is important that little fluid should be drunk* and that the meals should be small in quantity and concentrated in quality to avoid distention of the stomach. Ample intervals between meals should be allowed, that the stomach may have opportunity to rest. In bad cases rectal feeding for two or three weeks is advisable.

Lavage is the most valuable therapeutic measure in dilation. It is usually necessary, for a time at least, to use the tube once daily. The best time to wash out the stomach is some two or three hours after the evening meal; this gives the organ a good rest during the night. A weak antiseptic solution may be used to check fermentation, as of boric acid or salicylic acid; or, if there is acidity, sodium bicarbonate may be added to the irrigant.

Massage, abdominal gymnastics, electricity and hydrotherapy have undoubted value in this disease. They all aid in restoring the muscular tone of the patient, especially of the abdomen, and in the stimulation of metabolism. Turck claims good results from alternate distention and relaxation of the stomach with the inflatable bag—a species of gastric gymnastics.

Medicinal treatment is of minor importance and is addressed chiefly to the relief of annoying symptoms. Strychnin undoubtedly has some value as a direct stimulant to the motor function of the organ. It should be given in doses of $^1/_{30}$ to $^1/_{20}$ of a grain three times a day. As antifermentatives resorcin, naphthol, salol, bismuth salicylate, etc., are given. Hydrochloric acid is useful if there is insufficient secretion; if administered in large doses it may obviate the necessity for anti-ferments.

At the recent meeting of the International Medical Congress Cohnheim recommended large doses of olive oil in dilation of the stomach due to either organic or spastic stenosis. 50 Cc. (1½ to 2 ounces) of the oil, or more if it is well tolerated by

the stomach, is either swallowed or introduced through the tube three times a day—about half an hour before each meal; the oil should be warmed to the temperature of the body. It is claimed that this treatment quiets the spasms, reduces the friction and that the oil passes quite readily into the duodenum and is absorbed. Under this treatment all the symptoms are improved, especially the pain after eating, and the dilation is much reduced. It is of little value in purely nervous cases.

Constipation may require the use of the salines, cascara sagrada or rhubarb.

Stenosis of the pylorus may require surgical intervention. Several ingenious operations have been devised for the relief of dilation.

GASTRIC NEUROSES; GASTRIC INDIGESTION.

DEFINITION.—Under this title are included all forms of gastric indigestion not due to morbid changes of the stomach—in other words, all functional digestive disorders. It should be kept in mind, however, that if these conditions continue, alteration in the mucous or muscular structures of the stomach may result.

VARIETIES.—According to the character of the prominent symptoms three principal fundamental forms are given: (1) *Motor;* (2) *Sensory;* (3) *Secretory.* Each of these is subdivided into varieties according to whether there are (a) irritative or (b) depressed states of the organ. It should be remembered that there is often a mixture of these different varieties in the same individual; that they may alternate, or appear and disappear, or vary in intensity in any particular case according to the nature of the exciting cause.

ETIOLOGY.—Neurasthenia and hysteria are the main predisposing causes. The disease is more common in young adults, in women than in men and is excited by nervous strain, overwork, anxiety, worry, passion, sexual excesses, keeping late hours, irregular meals, coarse food hastily bolted, luxurious habits with insufficient exercise, etc. It may also appear as a reflex of various organic diseases elsewhere, as of pelvic diseases in the female, pregnancy (as the vomiting of pregnancy), genito-urinary disease, locomotor ataxia (gastric crises), kidney disease, lithemia, general neurasthenic states, etc.

SYMPTOMS.—The symptoms vary according to the character of the predominating neurosis,—whether it is one of motility, sensation or secretion. Usually these are mixed,—that is, for instance, hyperacidity may coexist with spasmodic conditions. In other cases hyperesthesia or vomiting may predominate. These symptoms are given in greater detail under the subheads that follow.

The nervous phenomena are usually prominent and general neurasthenic and hysterical symptoms coexist with the gastric symptoms.

MOTOR NEUROSES OF THE STOMACH.

I. IRRITATIVE STATES.

VARIETIES.—(a) Cardiospasm; (b) pylorospasm; (c) gastrospasm and peristaltic unrest (Kussmaul); (d) eructation; (e) nervous vomiting.

CARDIOSPASM.

ETIOLOGY.—In most cases this is probably excited by hyperesthesia, mechanical irritation or sometimes ulceration of the mucous membrane in the cardiac extremity of the stomach, or by the dilation of the stomach with air or gases. Very frequently air is swallowed by patients knowingly or unknowingly, and as it accumulates sets up spasm of the muscles at both the cardiac and pyloric valves. Or gases may be formed in the stomach in sufficient quantity to produce the same effect. Less often cardiospasm is due to a primary irritative nervous condition and is sometimes a symptom in neurasthenic states.

SYMPTOMS.—The condition may be either acute or chronic. In the former case it is a purely temporary affection prone to recurrence; in the second a very intractable disease. The leading symptom, when gas or air accumulates in the stomach, is distention and the pressure symptoms resulting therefrom, as dyspnea, cardiac oppression, rapid, soft pulse, and headache. As soon as the gas escapes relief is experienced. Vomiting is impossible during the continuance of the spasm. In hyperesthesia of the stomach with inflammatory changes there may be pain, but this is seldom very prominent.

In chronic spasm, in addition to these symptoms there is dif-

ficulty of swallowing. In severe forms, food may accumulate in a cul-de-sac in the esophagus. The stomach tube is often introduced with the greatest difficulty; in contradistinction from stenosis, a large tube is introduced more easily than a small one.

PYLOROSPASM.

ETIOLOGY.—Practically the same as in cardiospasm, i. e., it may be primary from local hyperesthesia induced by irritants or gases; or secondary, from a general neurosis.

SYMPTOMS.—Where cardiospasm and pylorospasm coexist, as in many cases, the symptoms are the same, viz., those of gaseous distention. When pylorospasm is prolonged there is stagnation of food, causing by its presence muscular stimulation, which results sooner or later in atony with dilation and its symptoms.

GASTROSPASM AND PERISTALTIC UNREST.

ETIOLOGY.—Due to the irritation of the mucous membrane resulting from hyperacidity, gaseous fermentation, pyloric stricture or a sensitive condition of the nerves of the stomach.

SYMPTOMS.—In gastrospasm the whole stomach is firmly contracted and may be felt through the abdominal wall. It is very rare.

The peristaltic unrest, described by Kussmaul, consists of continuous rhythmical contractions of the gastric muscles, from fundus toward pylorus. These appear after meals and may continue for some time with an empty stomach. The continual movement of the musculature produces decided discomfort, but no pain. Sometimes the contractions can be seen and felt externally.

ERUCTATION.

ETIOLOGY.—Symptomatic of various neurasthenic and hysterical conditions. Frequently due to the habit of swallowing air, which is later expelled; or it may be caused by the discharge of the gases of fermentation.

SYMPTOMS.—The principal symptom is the noisy eructation of gas, which is odorless and tasteless. When there is associated spasm of the cardia and pylorus there is distention of the stomach with gas, producing the condition known as *pneumatosis*. Allied to this condition is the regurgitation of the acid contents of the stomach, known as *pyrosis*.

NERVOUS VOMITING.

ETIOLOGY.—Due not only to hysteria and neurasthenia, but occurs as a reflex in serious organic diseases of the brain, the spinal cord (locomotor ataxia), the kidneys, liver, genital organs, and during pregnancy (vomiting of pregnancy).

SYMPTOMS.—The vomiting usually comes on at more or less regular periodical intervals, without prodromal symptoms, and without reference to the character of the food. It usually follows eating, but may occur irrespective of the time of taking food, or when the stomach is apparently empty.

THE PROGNOSIS of spasmodic conditions of the stomach is usually good, but dependent upon the possibility of curing the underlying nervous factor.

TREATMENT.—To effect a cure in these spasmodic conditions it is necessary to direct special attention to the underlying cause. This is, in most cases, neurasthenia or hysteria. Rest in bed (in bad cases), change of scene, avoidance of excitement, hydrotherapy and a regular diet are the most important parts of the treatment. The food should be bland but highly nutritious. Milk may be given exclusively at first; later, scraped or minced raw lean meat is allowed. This dietary is gradually enlarged to include soups, bouillon, eggs, ham and the amylaceous foods, such as rice, farina, wheat preparations, etc. Foods which are likely to ferment or stagnate are to be excluded.

Careful watch should be kept of the habits of the patient. Swallowing air should be forbidden and psychic influences used to correct any hysterical tendency. These patients are usually very susceptible to suggestions for good or evil, and this fact should be taken advantage of.

When there is an accumulation of air or gas in the stomach the passage of a tube permits its escape and relieves its symptoms. When this is made difficult by spasm, spraying the affected area with a solution of menthol and cocain, after the method of Einhorn, is often effective. Hemmeter by this means has succeeded in passing a sound through the pyloric orifice, in cases of pylorospasm. The intragastric spray is also useful in relieving pain and hyperesthesia of the stomach. Galvanism is highly recommended in these spasmodic conditions. The anode

is applied to the interior of the stomach and the cathode to the back of the neck or sternum and a mild current used. Lavage is demanded when there is stagnation of food.

Externally the cold abdominal pack, after the method of Winternitz, may be used with decided advantage. In painful conditions hot fomentations or sinapisms to the epigastrium will give relief.

Few drugs are required. Among the most useful sedatives are the following: Sodium, potassium and strontium bromid, 10 to 20 grains three or four times daily, (the latter is highly recommended by Hemmeter); valerian, the ammoniated tincture or elixir in ½ to 1 dram doses; extract belladonna, ⅛ to ¼ grain; codein sulphate or phosphate, ¼ to ½ grain, and chloroform water in dram doses. These may be variously combined. Fermentation may be checked by salol, bismuth subnitrate, benzonaphthol and other similar drugs.

In nervous vomiting it may be necessary to feed by the rectum. Cerium oxalate is an old and valuable remedy, but severe cases may require hypodermics of morphin, or opium and belladonna suppositories. Two good formulas recommended by Hemmeter are given:

Cerium oxalate	dr. 1
Cocain hydrochlorate	gr. 3
Menthol	gr. 12
Bismuth salicylate	dr. 1
Simple elixir	oz. 6

Tablespoonful on an empty stomach four times daily.

Menthol	gr. 15
Cocain hydrobromate	gr. 6
Chloroform water	oz. 4
Brandy	oz. 2

One tablespoonful three times a day, largely diluted.

The bromids and chloral are useful when vomiting occurs at night.

II. Depressive States.

Varieties.—(1) Insufficiency of the cardia; (2) insufficiency of the pylorus; (3) gastric atony.

INSUFFICIENCY OF THE CARDIA.

Etiology.—Nervous and psychic influences are present in these cases as in other gastric neuroses. The incontinence is due

to a depressed or paretic condition of the motor nerves supplying the valve, resulting in relaxation. Imperfect mastication and bolting of food are exciting causes. Whooping cough may cause it in children.

SYMPTOMS.—According to the predominating symptom two varieties are noted; (1) regurgitation where more or less of the food is returned to the mouth, and expectorated at varying intervals after eating. This food may be unchanged, and acid or bitter, according to the stage of digestion. If much food is habitually regurgitated the general health may suffer. (2) Rumination or merycism, where the food which is returned to the mouth is rechewed and swallowed again. It causes no nausea and there is a degree of enjoyment in rechewing the food.

INSUFFICIENCY OF THE PYLORUS.

ETIOLOGY:—A very rare disease. Its cause is the same as the similar affection of the cardia, viz., defective innervation of the pyloric muscles. Ulceration and carcinoma may produce incontinence of the pylorus.

SYMPTOMS.—Pyloric incontinence permits undigested food to pass rapidly through the stomach into the bowel. If intestinal digestion is well performed no marked symptoms may result. It is usually recognized by inflating the stomach with gas. If the valve closes insufficiently the gas rapidly passes over into the intestine. This test is more reliable if given during a test meal.

ATONY OF THE STOMACH.

ETIOLOGY.—It may occur as one of the symptoms of various nervous disorders; as a result of serious acute and chronic diseases; as a primary neurosis, caused by overloading the stomach, especially with fluids; by abuse of alcoholic liquors; as a complication of spasmodic, inflammatory and ulcerative conditions of the stomach; and as a result of stenosis of the duodenum or jejunum. The underlying factor is an exhausted or poorly nourished condition of the stomach.

SYMPTOMS.—The characteristic feature of this condition is a lack of motility, and temporary dilation. After eating there is a feeling of fullness and oppression in the epigastrium, which persists until the stomach is emptied. In cases seen early in the disease this sensation lasts for only an hour or so; in advanced

cases it may persist from one meal to another. In ordinary cases of atony, when the stomach becomes empty it returns to its normal size and the patient feels usually well, but in advanced cases there may result a permanent dilation. Accompanying symptoms are headache, eructations of gas which taste of the food, vomiting, if there is hyperacidity, and constipation. Hemmeter notes that the symptoms of pressure are most pronounced after breakfast.

Various physical methods are used to test the motility of the stomach. By succussion the splashing of liquid may be felt in a dilated myasthenic stomach, or it may be heard by placing the ear to the epigastrium or by the use of the stethoscope. This differs from permanent dilation in the fact that this sound is absent early in the morning when the stomach is empty. The outlines of the stomach can be determined by percussion. In order to prevent confusion with the colon, either this or the stomach should be filled with water, but not both. The elasticity of the organ may be learned by gradually filling it with water and by percussion, marking its descent as the weight in it increases. Or the interior of the organ may be lighted with Einhorn's gastrodiaphane, when the outline can be seen by transillumination. Or with the X-ray the outline may be seen, if bismuth subnitrate is taken internally to form a coating upon its inner walls. By the use of salol and the test meal the time necessary to empty the stomach may be determined.

TREATMENT.—Treatment to be successful must involve a knowledge of the causation of the disease. For instance, neurasthenics may require the rest cure, anemia calls for iron, syphilis for mercury and the iodids, and gynecological diseases for the special treatment indicated in such cases.

Hygienic and dietetic treatment is of the most importance. The patient should avoid excitement, have an abundance of sleep and take suitable exercise, especially such as will strengthen the abdominal muscles. If weak and easily exhausted, massage is of great benefit in restoring tone to the weakened muscles. Faradization is valuable for the same reasons and may be used both externally to the epigastrium and within the viscus. Cold shower and sponge baths and the cold abdominal pack are useful and if there is enteroptosis the abdominal binder should be worn.

The meals should be frequent, small, highly nutritious and easily digested; not much fluid should be allowed and the patient should be directed to eat slowly and to thoroughly masticate the food. Usually a mixed diet may be given, but this depends upon the acidity. If there is excess of hydrochloric acid the proteids should be relatively increased. Diet may usually be arranged to correct the constipation. For intragastric use, alternate douching with hot and cold water, distention with air and the needle spray will be found effective.

Medicinal Treatment.—The drug of greatest value is strychnin,—or nux vomica. Anders is accustomed to use the following formula:

Tinct. nux vomica .....dr. 2½
Infusion cascarilla, enough to make.....oz. 4
Two teaspoonfuls three times a day.

Where there is insufficient gastric juice Hemmeter uses:

Strychnin sulphate.....gr. ⅓
Dil. hydrochloric acid .....dr. 4
Elixir gentian, enough to make.....oz. 4
Tablespoonful in water after meals.

With excess of acid juice sodium bicarbonate or other mild alkali should be taken. The following has been found valuable:

Strychnin sulphate.....gr. ⅓
Extract belladonna.....gr. 1
Bismuth salicylate .....dr. 1
Make 12 capsules. One after each meal.

SENSORY NEUROSES.

Varieties.—(1) Hyperesthesia; (2) Gastralgia; (3) Anorexia; (4) Hyperorexia.

HYPERESTHESIA.

Etiology.—It is most common in nervous women. Chlorosis and anemia and the debility following severe disease are predisposing causes. Exciting causes are mental strain, overwork, excitement and errors of diet, such as the continued use of indigestible food, including highly spiced, salty and acid articles, and very hot or cold liquids. Hyperacidity may produce it.

Symptoms.—These consist of a variety of unpleasant sensations which come on after eating,—differing entirely in this respect from gastralgia, which often appears when the stomach

is empty. There is a sense of fulness, burning and pain in the epigastrium, the patient is conscious of an increased motility of the organ and the throbbing of the aorta seems painfully apparent. The presence of food provokes nausea and often vomiting. If produced by hyperacidity the symptoms are most severe after the appearance of hydrochloric acid in the stomach. As a rule, when the stomach becomes empty, the disagreeable symptoms disappear; they are entirely absent in the morning before eating. The discomfort follows every meal and may persist for days or weeks. There are often associated with this condition other nervous symptoms, such as headache, neuralgia, etc. The appetite is often unaffected, but the patient may restrict his food and become emaciated on account of the emesis which is produced by eating. These patients frequently have a peculiar tolerance for apparently indigestible articles. A type of this gastric hyperesthesia is that in which urticarial eruptions follow certain kinds of food, such as strawberries, lobsters, etc.

TREATMENT.—Nervous patients should avoid excitement and abstain from exhausting mental occupations. Rest is an important factor in effecting a cure, and it may be best to put the patient in bed for a time. If there is anemia, iron is to be given, as in the form of the peptomanganate or Blaud's pill. Hot fomentations or a hot water bag to the stomach during digestion is soothing and gives some relief. The food should be largely liquid and devoid of irritation. Milk, soft toast, soft boiled or poached eggs and scraped beef are suitable for severe cases. The dietary may be gradually enlarged as the patient improves. Alcohol, tea, coffee, or tobacco should be stopped. Intragastric or epigastric galvanization is useful.

The remedies most generally useful are the bromids. Codein may also be used and the Einhorn intragastric spray of cocain and menthol will be found useful. If there is hyperacidity, alkalies, as sodium bicarbonate, are to be given.

GASTRALGIA; GASTRODYNIA; CARDIALGIA; NEURALGIA OF THE STOMACH.

DEFINITION.—Paroxysmal pain in the stomach, neuralgic in character, without gastric lesion.

ETIOLOGY.—It occurs with most frequency in neurotic or

hysterical females, and is often connected with menstrual derangements; it is often troublesome at the time of the menopause. Weakness, debility, anemia, malaria, syphilis, hemorrhage, etc., are predisposing causes. Exciting causes are overwork, grief, worry, anxiety and gastric disturbance, especially hyperchlorhydria. It usually occurs independent of taking food. Attacks of severe gastric pain may be symptomatic of cancer, ulcer of the stomach or locomotor ataxia.

Symptoms.—The attacks may be preceded by prodromes, as headache, depression of spirits and fulness of the epigastrium, or may commence suddenly with agonizing boring, paroxysmal pain, shooting through to the back, relieved by pressure and the ingestion of hot fluids and foods. The skin is moistened with a cool, clammy sweat, the extremities are cold and the pulse is rapid and weak. The attack lasts from a few minutes to an hour or more and terminates with eructations of gas, nausea and vomiting, or the passage of a large quantity of pale urine. There is no connection between the attacks and taking food; they are more likely to come on when the stomach is empty. They are often associated with other nervous symptoms of an exceedingly variable character. They tend strongly to return at periodical intervals, and for this reason are often thought to be of malarial origin.

Diagnosis.—In gastric ulcer the pain is most severe after eating and is increased by taking food; there is often vomiting of blood; there is localized tenderness over the epigastrium and pressure increases instead of relieving the pain; the patient's general health is more seriously impaired.

In gastric carcinoma there is cachexia; the patient is usually past middle life; hydrochloric acid is usually absent from the stomach; the pain is continuous; pressure increases pain; there is vomiting of "coffee-grounds" matter, consisting of disintegrated blood.

In angina pectoris the pain is paroxysmal, but in the cardiac region, running down left arm; there is a sense of suffocation and impending death.

In biliary colic the pain is in the right hypochondriac region; is unrelieved by pressure; there is transient jaundice; the urine is dark and contains bile; there is intermittent fever.

PROGNOSIS.—Favorable as to the attacks, but there is a tendency to recurrence.

TREATMENT.—If due to the presence of irritant or decomposing food in the stomach an emetic or gastric lavage is indicated. For the relief of very severe pain a hypodermic of morphin (¼ grain) is generally required. In most cases an antispasmodic and carminative administered by the mouth will usually be found effective. Hoffman's anodyne (½ dram), aromatic spirits ammonia (½ dram), chloroform (10 drops), camphorated tincture of opium (½ to 1 dram) or essence of peppermint, any of these, given in water, may be tried. A good combination is that recommended by Tyson:

Chloroform	oz. 1
Comp. tinct. cardamom	oz. 1
Arom. spts. ammonia	oz. 1
Brandy	oz. 1

Teaspoonful in water every half hour until relieved.

Chlorodyne, the Mistura Chloroformi et Cannabis Indica Comp. of the National Formulary, is a most effective preparation for this disease.

Chloroform	Cc.	12.50
Tinct. cannabis Ind.	Cc.	12.50
Glycerin	Cc.	12.50
Ether	Cc.	3.50
Tinct. capsicum	Cc.	6.50
Water	Cc.	6.50
Oil peppermint	Cc.	.20
Morphin sulph	Gm.	.25
Alcohol, enough to make	Cc.	100.00

The dose is 15 to 60 minims.

Hot fomentations, sinapisms or turpentine stupes may be applied to the epigastrium and give decided relief. Sometimes galvanic or faradic electricity is applied locally with benefit.

In the intervals the patient's general health should be built up by treatment addressed to the underlying cause. In gastric hyperacidity the patient should be put upon a bland unirritating diet (see Hyperchlorhydria) and alkalies administered when necessary. Constipation requires treatment. If there is anemia or debility tonics are indicated, such as peptomanganate of iron, elixir iron quinin and strychnin, cod-liver

oil, malt, etc. Neurasthenic females are helped by rest, massage, electricity, regulated habits, a generous diet and simple tonic medication. The bromids and valerian are frequently required in these cases, in connection with or alternating with the tonics. Anders recommends:

Zinc valerianate.....gr. 18
Quinin valerianate.....gr. 26
Iron arseniate.....gr. 2
Make 18 pills. One after each meal.

ANOREXIA; LOSS OF APPETITE.

ETIOLOGY.—Loss of appetite occurs in nearly all serious diseases, acute and chronic. As a distinct neurosis it may exist when there is an intact condition and perfect functioning of the stomach. It is usually due in these cases to the nervous state found in neurasthenia and hysteria.

SYMPTOMS.—The only marked symptom in mild cases is the aversion of the patient to food. Hemmeter notes that there is usually a reduction of HCl. If it continues, the patient may become emaciated, anemic and debilitated because he does not take sufficient food.

TREATMENT.—The underlying nervous condition must be treated. The rest cure, mild exercise, massage, electricity and hydrotherapy and the judicious use of iron and arsenic in the anemic are the usual remedies for these cases. The bitter tonics, nux vomica, strychnin, cinchona and gentian are useful; they may be combined with hydrochloric acid with advantage in most cases, as

Tinct. nux vomica.....dr. 1
Tinct. cinchona comp.....oz. 1
Acid hydrochloric dil.....dr. 2-4
Syrup ginger, enough to make.....oz. 6
Tablespoonful in water taken through a glass tube after each meal.

A recently introduced remedy which has proven extremely valuable in these cases is orexin, 5 to 10 grains of which may be taken three times a day.

In obstinate cases forced feeding through the stomach tube (gavage) is necessary.

HYPEROREXIA; BULIMIA; EXCESSIVE APPETITE.

ETIOLOGY.—This may be symptomatic of other diseases, notably diabetes mellitus, or may be a true neurosis.

SYMPTOMS.—There is an intense feeling of hunger, at times almost uncontrollable. It comes on generally an hour or two after eating, but may rarely appear within a few minutes after a hearty meal. If the desire for food is not immediately relieved there is serious nervous disturbance, with such symptoms as a sense of great weakness, headache, pallor, cardiac palpitation, ringing in the ears and epigastric pain. A small amount of food usually gives entire relief, but in severe cases frequent repetition of the desire may occur. Usually these attacks recur at irregular intervals. Rarely they are continuous.

Acoria is a condition in which no feeling of satiation follows the ingestion of food, no matter how large the meal.

TREATMENT.—The causal disease requires treatment if it can be discovered. Neurasthenia should be managed as already directed; the bromids, electricity and hydrotherapy are efficient means of treatment. Cocain by intragastric spray and morphin internally are used in this affection with good results. Boas recommends Fowler's solution in gradually increasing doses.

NEUROSES OF SECRETION.

VARIETIES.—(1) Hyperchlorhydria; (2) hypochlorhydria; (3) achlorhydria.

HYPERCHLORHYDRIA; HYPERCHYLIA; HYPERPEPSIA; HYPERACIDITY.

DEFINITION.—A very common condition of the stomach in which there is an excessive secretion of hydrochloric acid. Einhorn found that one-half of his cases of stomach trouble had hyperchlorhydria.

ETIOLOGY.—Excess of hydrochloric acid is found in gastric ulcer, and occasionally in other morbid conditions, as the gastric crises of tabes and migraine. The condition is in most cases, however, a neurosis and most common among nervous people. It occurs in men more often than in women and among the better classes of society—the brain workers —but it is not infrequent

in the laboring class. A meat or proteid diet, highly seasoned foods and alcoholic drinks undoubtedly favor the production of the condition

SYMPTOMS.—The normal quantity of hydrochloric acid in the stomach during digestion varies from 0.15 to 0.2 per cent. In hyperchlorhydria the amount is increased to 0.3 to 0.6 per cent, or exceptionally even more. Moreover, the secretion of the acid after eating is greatly hastened, thereby retarding the digestion of the starchy food which is normally continued for some time in the stomach. Albuminous food, on the other hand, is digested with great rapidity in the presence of the excess of acid.

This hyperacidity produces marked disturbance of sensation. Pain, more or less severe, sometimes only a discomfort, but usually burning, gnawing or cramp-like, appears from one to three hours after taking food. Hewes found that in some of his cases it appeared within thirty minutes. This pain lasts from one to three hours or more, may continue through the night and is relieved by taking alkalies and albuminous foods. There is usually well marked diffuse tenderness over the epigastrium.

Eructation of gas is one of the most common symptoms and frequently there is regurgitation of acid fluid and nausea. Vomiting occurred in one-third of Hewes' cases.

The gastric hyperacidity may cause hyperesthesia of the mucous membrane with spasm of the entire organ or of the cardia or pylorus. Undoubtedly the severity of the symptoms is proportionate in a large measure to the degree of hyperesthesia,—perhaps more than to the amount of acid. In some patients a very small quantity of acid will excite most violent symptoms, especially if the patient is neurotic. As a result of pyloric spasm it not infrequently happens that the passage of food into the intestine is delayed. The prolonged excitation of the muscular structure may result in atony of the stomach with dilation; the secreting surfaces may from similar cases be injured and interference with the blood supply may cause gastric ulcer near the pyloric orifice. The pylorus may become more or less stenosed.

The passage of very acid food into the bowel prolongs intes-

tinal digestion and causes constipation; this is a nearly constant symptom. The acidity of the urine is generally reduced during digestion.

Headache, vertigo, etc., are concomitant nervous symptoms in hyperchlorhydria.

DIAGNOSIS.—According to Einhorn, the symptoms of special diagnostic value are (1) pain appearing two or three hours after eating, (2) appetite and thirst normal or increased, (3) absence of cachexia, and (4) constipation. The critical test is, of course, the demonstration of an excess of hydrochloric acid. In all suspected cases the stomach contents should be examined after the test meal. (See Appendix.)

The disease with which simple hyperchlorhydria is most likely to be confused is gastric ulcer, in which there is also an excess of hydrochloric acid. In gastric ulcer the pain appears soon after eating, is more likely to be constant and is unrelieved by alkalies and albuminous foods. In hyperchlorhydria there is diffuse epigastric tenderness; in ulcer it is circumscribed and pain radiates toward the loins and shoulder blades. Vomiting is more frequent in ulcer, occurs often at night, and the vomitus may be stained with blood.

Closely allied to hyperchlorhydria is *gastro-succorrhea (gastroxynsis)* in which there are periodical attacks of excessive gastric secretion with superacidity. It occurs more often when the stomach is empty, often in the night and is associated with severe epigastric pain, nausea and the vomiting of enormous quantities of very acid gastric fluid which may be stained with bile and contain mucus. Appetite is lost, but there is great thirst. Headache, pallor, coldness of the extremities and evidences of collapse may accompany the stomach symptoms. These attacks come on when the health is apparently perfect, last a day or two and are followed by the usual good health. They often recur.

A condition of chronic hypersecretion has been described by Reichmann, called by him *gastro-succorrhea continua chronica.* In this, even when fasting, the stomach continues to secrete gastric juice, and this process becomes continuous. Vomiting of acid food is a daily occurrence. Schreiber, Boas, Hemmeter

and others consider it a symptom of ulcer or motor insufficiency and not a separate idiopathic nervous disease.

PROGNOSIS.—Usually good, but cure is more difficult in cases that have become chronic, which may resist treatment. If the disease persists a long time a chronic catarrh of the stomach may be induced. Probably ulcer may result from hyperacidity with gastric spasm.

TREATMENT.—*Hygienic and Dietetic.*—The patient should be put upon a hygienic regime suited to neurasthenics, including rest from exhausting mental or physical work, regular hours, avoidance of excitement and gentle outdoor exercise.

A suitable diet is of the greatest importance in treating these cases. We must aim not only to give foods which will relieve the symptoms, but, as well, those which will nourish the patient best and raise the standard of his health. If he is well nourished local sensitiveness will often quickly disappear. While the patient readily digests the proteid foods, starch digestion is hindered by the action of the acid present in the stomach, therefore, after a meal rich in carbohydrates, fragments of unconverted starch remain in the stomach to undergo fermentation and prolong the irritation. The albuminous food, on the other hand, enters into ready combination with the acid, thereby checking irritation. A proteid diet seems to be indicated in these cases, but it should be remembered that lean meats—the form in which proteids are usually taken—undoubtedly stimulate the secretion of hydrochloric acid. It is therefore apparent, as Hemmeter points out, that there is a certain clashing of indications. On the one hand bland, non-stimulating food is indicated; on the other, food which will enter into the combination with the most hydrochloric acid. Following this author, it seems wise to advise a diet list which shall as nearly as possible meet both these indications. Meat is undoubtedly indicated in many, perhaps most cases, but when its use is followed by a persistence of the symptoms a change to carbohydrate diet may be necessary.

In most acute cases milk is to be given; at the start it may be necessary to give it exclusively. Stockton advises that it be taken hot, about six ounces sipped slowly every two hours. When the irritation has somewhat subsided, a little thoroughly

toasted bread, as zwieback, or the Battle Creek preparation, granose, may be allowed; this may be eaten alone unmoistened by fluid. A soft boiled or raw egg once or twice daily may then be added to the list and the diet thus gradually enlarged. Einhorn advises five or six meals daily, the large meals to be taken at the usual time and between meals a glass of milk with a cracker or a slice of bread and butter to enter into combination with any free acid. Hewes advises a raw egg when there is pain.

As already said, considerable difference of opinion exists as to the eating of meat. Stockton gives it only at the last regular meal of the day and suggests as a sample day's dietary a breakfast consisting of a soft boiled egg, a dry stale roll and a bit of broiled bacon; in the middle of the forenoon a glass of hot milk; at noon, zwieback and hot milk; in the middle of the afternoon a glass of hot milk; and at evening a substantial dinner, consisting of fish, beef or mutton, with fresh vegetables, etc., but no dessert.

Most authorities recommend dependence upon a raw, finely-chopped meat diet and in severe cases this certainly gives the speediest relief. The meat may be spread upon thinly sliced layers of stale bread, toast or zwieback. As a substitute for the raw meat, somatose, Mosquera beef-meal or similar concentrated foods may be taken. These combine with a large quantity of HCl. Where milk disagrees, as is not infrequently the case, the meat should be tried. Later, cooked meats (veal, beef, mutton and ham), minced at first, may be given.

The condiments (spices, mustard, pepper, etc.) and alcoholic drinks of all kinds should be forbidden. *All acids disagree with these patients.* Most fruits and many vegetables cannot be taken for this reason. Strawberries, cherries, apples, tomatoes, raspberries, oranges, lemons, grapes, fruit juices, sour wines, must not be allowed. Pure fats and oils are not only allowable but beneficial, since they seem to diminish hydrochloric acid secretion. Butter and cream are especially desirable.

The patient should not drink too large quantities of water at one time, but should be directed to take small quantities often. The alkaline mineral waters serve not only to dilute the acid, but also to neutralize it. Vichy may be taken at meals and may be used to dilute the milk, if found more agreeable.

Medicinal Treatment.—The drugs most used in hyperchlorhydria are the alkalies, for the purpose of neutralizing the excess of acid. Sodium bicarbonate is the favorite. Tyson has shown that a large quantity is required for this purpose in an average case. It should be taken after meals—just before the pains are expected—dissolved in water or milk. One-half to one dram is the usual dose. The large amount of carbon dioxid generated sometimes causes an unpleasant fullness of the epigastrium. When this symptom is complained of, other alkalies may be used. One of the best is calcined magnesia, a smaller dose of which is required and which has the advantage of being a mild laxative. Liquor potassae (15 to 30 drops in milk) may be used with benefit, or sodium benzoate in 10-grain doses when an antifermentative is desired. A drug that decidedly decreases the production of hydrochloric acid is belladonna, or its alkaloid, atropin, small doses of which sometimes have a remarkable influence. Bismuth, cerium oxalate and similar drugs are also used for their local effect. Various combinations of these remedies used by various authors follow. Einhorn recommends:

Sodium bicarbonate.....dr. 5
Calcined magnesia.....dr. 5
One-half to one teaspoonful three times a day.

Or,

Sodium bicarbonate.....dr. 5
Calcined magnesia.....dr. 2½
Ammonio-magnesium phosphate.....dr. 2½
One-half to one teaspoonful three times a day.

If there is constipation he gives rhubarb.

Calcined magnesia.....dr. 2
Powd. rhubarb.....dr. 2
Sodium carbonate, exsic.....dr. 4
Sodium bicarbonate.....dr. 4
Peppermint sugar.....dr. 4
One-half to one teaspoonful three times a day.

Hemmeter's favorite formulas are:

Calcined magnesia.....dr. 4
Sodium bicarbonate.....dr. 2
Powd. rhubarb.....dr. 2
Ext. belladonna.....gr. 8
One-half teaspoonful forty-five minutes after each meal,

Sodium bicarbonate.....dr. 2
Potassium carbonate.....dr. 2
Calcined magnesia.....dr. 2
Extract belladonna.....gr. 6
Milk sugar.....dr. 8
One-half teaspoonful one hour after each meal.

Stockton finds that the following "gastric sedative" best meets the indications:

Cerium oxalate.....gr. 15
Bismuth subcarbonate.....gr. 30
Calcined magnesia.....oz. 1
Teaspoonful one or two hours after eating.

Boas' formula for excessive secretion is the following:

Calcined magnesia.....dr. 4
Bismuth carbonate.....gr. 80
Sodium carbonate.....gr. 80
Extract belladonna.....gr. 1½—3
Extract nux vomica.....gr. 1½—3
Teaspoonful three times daily one-half hour after meals.

Other drugs which have been recommended are codein phosphate (¼ to ½ grain daily), the bromids, especially strontium bromid, and sodium sulphate particularly in the form of the Carlsbad water, which is said to reduce the acidity. Iron should be given in all cases of anemia, in the form of the tincture of the chlorid, Blaud's pill or ferratin. It should be remembered that the real aim of treatment is to build up the patient.

Gastrosuccorrhea is treated in practically the same manner as the above. When vomiting is frequent, lavage with subsequent administration by the tube of the bismuth salts for their sedative effect or silver nitrate (1:1000) may be necessary. Sinapisms or a hot-water bag may be applied to the epigastrium.

Electricity is useful in these cases, with the anode in the stomach, which is filled with warm water. Usually galvanism is preferred.

Hydrotherapy, in the form of the hot and cold trunk pack and cold friction sponging is valuable. Massage, Swedish movement, etc., help to build up the muscular tone.

HYPOCHLORHYDRIA; HYPOCHYLIA; SUBACIDITY.

ETIOLOGY.—A deficient secretion of hydrochloric acid is a symptom of chronic gastritis and carcinoma of the stomach (which see). It occurs as a pure neurosis, without organic change of the stomach walls, in neurasthenic and hysterical patients and in the psychoses.

SYMPTOMS.—In this condition the secretion of hydrochloric acid is reduced. There may be no symptoms unless the motility of the stomach is decreased. If this is the case there will be stagnation of food and fermentative changes, with the formation of gas, eructations and an uncomfortable sense of pressure. The proteids of the food are likely to undergo further decomposition in the bowels and constipation, with the passage of foul smelling stools, results. Starches are digested better than albuminous foods.

DIAGNOSIS.—In gastric cancer there is usually cachexia; there is an excess of lactic acid, which is very rare in subacidity; a constant decrease of the hydrochloric acid (this varies greatly from time to time in nervous subacidity and may alternate with a normal quantity or an excess); there is usually decided pain; vomiting is a prominent symptom and the matter rejected sooner or later usually contains blood of the characteristic "coffee-ground" appearance.

In chronic gastritis more or less mucus and epithelial debris will be found in the washings from the stomach; the subacidity is more constant than in the neurosis. A normal amount of pepsin and rennin indicates nervous acidity.

PROGNOSIS.—Usually good, but dependent upon the cause.

TREATMENT.—*Dietetic.*—The foods most easily digested are the carbohydrates, and these must mainly be depended upon. Einhorn advises foods which will be largely disposed of in the intestines and accordingly gives the starches mainly. Pancreatin and extract of malt aid in their digestion. Some proteid food should be given, not only to meet the nutritive demands of the body but for its local stimulating effect. Meats when given should be chopped fine and well masticated. Stockton advises giving meat at the evening meal only, with hydrochloric acid and pepsin.

Medicinal Treatment.—When albuminous foods are taken,

hydrochloric acid should be given after meals. The dose used is generally too small. At least 20 to 30 drops of the dilute acid should be taken, well diluted, through a glass rod, half an hour after eating. The bitter tonics are prescribed with advantage in these cases. Nux vomica is the most useful but cinchona, gentian, columbo, etc., may be used. Orexin (5 to 10 grains) also gives good results. Sometimes the tincture of capsicum taken before meals is found decidedly effective.

Hemmeter's favorite formula is:

Strychnin sulphate	gr. ⅓
Dilute hydrochloric acid	oz. ½
Fl. ext. condurango	oz. 1½
Elixir gentian, enough to make	oz. 6

Tablespoonful in water through glass tube, one-half hour before eating.

Ewald orders the following when there is fermentation:

Tinct. nux vomica	dr. 6
Resorcin	gr. 80
Bitter tincture	dr. 3

10 to 15 drops every two hours.

If there is stagnation of food with fermentation washing with the stomach tube is required. Intragastric faradization is of undoubted value.

ACHLORHYDRIA; ACHYLIA GASTRICA.

Definition.—Absence of the secretion of the gastric juice, no hydrochloric acid being secreted.

Etiology.—The disease is an unusual neurosis. Hydrochloric acid may also be absent in atrophy of the peptic glands in advanced cases of chronic gastritis and in carcinoma of the stomach.

Symptoms.—The condition may exist a long time without producing any symptoms providing the motility of the stomach is intact and intestinal digestion is good. Sooner or later dyspeptic symptoms usually arise from stagnation of food, such as eructation, a sense of distention after eating, nausea, vomiting, etc. Severe attacks of gastralgia are not infrequent and there is a distinct tendency to the production of lienteric diarrhea. Headache, nervousness and similar neurasthenic symptoms may add to the discomfort.

TREATMENT.—Essentially the same as hypochlorhydria. The diet should consist largely of food which is digested in the intestines and which will not accumulate in the stomach to impair motility.

Hemmeter advises semi-liquid food in the form of mushes and gruels. Meat should be finely chopped or scraped, given in rather small quantity and followed by dilute hydrochloric acid. This acid is the most valuable medicine in these cases. It should be given in 20-drop doses after meals, repeated every half hour until two or three doses are taken, or combined with pepsin which is theoretically indicated in these cases. The tonic bitters, as strychnin, nux vomica, condurango, gentian and quassia, are also useful in stimulating secretion, though they often entirely fail. The following prescription is useful:

Strychnin sulphate	gr. ¾
Dil. hydrochloric acid	oz. 1
Tinct. gentian comp	oz. 3
Tinct. cardamon comp., enough to make	oz. 6

Dessertspoonful one-half hour after eating, in water, through a glass rod.

Faradic electricity by the intragastric electrode, the stomach being partially filled with a saline solution, has a distinct stimulant value. If food stagnates lavage is necessary. Diarrhea is benefited by salol and bismuth.

In this as in all the gastric neurosis it is important to improve the general health by rest, suitable exercise, massage, hydrotherapy and any indicated remedies for debility, anemia, etc.

GASTRIC ULCER; ULCER OF THE STOMACH.

ETIOLOGY.—Ulceration of the stomach is caused by digestion of a portion of the mucosa by the gastric secretion. Just why this occurs and why the stomach does not digest its own walls is not yet clearly understood. The underlying causes are those which produce impairment of cellular resistance, impoverishment of the blood, local bacterial infection and hyperacidity. Prominent among these causes are injuries by the ingestion of foreign bodies, by continual external pressure (as in shoemakers, weavers, etc.), burns from taking hot liquids, sometimes cutaneous burns, thrombosis and embolism of the local blood-vessels, changes in

the vascular walls, anemia, chlorosis, tuberculosis, syphilis and other debilitating diseases which alter the character of the blood or weaken the arteries. Hyperchlorhydria is almost always present and is probably the principal exciting cause. Gastric ulcer is more common among females and most frequent between the twentieth and thirtieth years, though it may occur at any age; it is very rare in young children. The poor suffer more than the well-to-do.

PATHOLOGY.—The ulcer is in most cases situated on the posterior wall, near the pylorus. It is usually circular or rounded in outline, funnel-shaped, with clean-cut edges and may penetrate all the layers of the gastric wall and perforate into the peritoneal cavity,—but its floor is usually the muscular coat. It seldom exceeds one-half inch in diameter but may become very large, rarely attaining a diameter of four inches or more. These large ulcers are usually caused by the coalescence of a number of smaller lesions. An ulcer may erode a blood vessel and in this way become the cause of serious hemorrhage. They terminate by cicatrization, during which the scar tissue causes considerable contraction, or by perforation. In the latter case the outer coat of an adjoining viscus may become the floor of the ulcer or an opening may be made into the peritoneal cavity, the bowel, the pleural cavity or even externally.

SYMPTOMS.—The most constant and prominent symptom of gastric ulcer is pain. This is seldom entirely absent and is greatly intensified in most cases by taking food, coming on usually within half an hour after eating. It is then of an extremely severe burning, boring character. Very rarely it comes on later in the process of digestion, but this suggests duodenal ulcer. It may sometimes be momentarily relieved by taking albuminous food. This pain may be somewhat diminished by perfect rest and certain postures, as by lying on the back; it is increased by lying on the left side. It often passes through the body and is felt in the back between the shoulder blades and is radiated in various directions. The pain is distinctly circumscribed, being most intense in a small area usually one or two inches below the xiphoid, a little to the left. This point is also the seat of acute tenderness when subjected to pressure. Another point of tenderness is found in the back a little to the left of the

tenth to twelfth dorsal vertebrae. Intermittent attacks of gastralgia may occur.

An increase of hydrochloric acid secretion is an almost constant accompaniment of the disease. This usually ranges from 3 to 5 per cent. Organic acids are absent.

Vomiting is a fairly constant symptom and often gives relief by emptying the organ and stopping the stretching of the ulcer. It usually appears at the height of digestion. There may be the associated dyspeptic symptoms of acid eructations, pyrosis, etc.

Of most diagnostic value is hematemesis or the vomiting of blood. If hemorrhage is very free this will come up pure and bright, more or less clotted. If slight, it is retained in the stomach for some time, partially digested and ejected as a "coffee-ground" appearing substance. Blood may also appear in the stools as a tarry-like mass. Severe hemorrhage is often of grave prognostic value and may cause sudden death. Anemia is a result of much loss of blood and may be very pronounced.

External examination usually reveals little but the tenderness already mentioned. When the ulcer is near the pylorus and much thickening results, a tumor may sometimes be felt.

DIAGNOSIS.—The diagnostic symptoms which are of most value are (1) an excess of hydrochloric acid; (2) severe localized pain, coming on soon after eating, with corresponding points of tenderness in epigastrium and back; (3) gastric hemorrhage. When any of these is absent some confusion may arise. There is no hemorrhage in one-half the cases.

In hyperchlorhydria there is considerable irregularity of pain; it is usually less intense, is diffuse and associated with generalized tenderness.

In cancer there is cachexia; diminished hydrochloric acid; the hemorrhage is small in quantity, more frequently decomposed and darker in color. The stomach washings often show distinctive evidences of the disease.

In chronic gastritis there may be slight hematemesis, but hydrochloric acid is greatly reduced; mucus and epithelial fragments are found; pain is not a prominent symptom; the tender points are absent.

In simple gastralgia the paroxysm comes on regardless of food; pain is relieved by eating and pressure diminishes instead of

increasing it; there are no tender points; no hematemesis; the general health is unaffected.

In hepatic colic pain cannot be referred to taking food; there is no hemorrhage; dorsal pain is two inches to the right of the twelfth dorsal or first lumbar vertebrae; there is no hydrochloric acid excess; jaundice usually follows the attack.

PROGNOSIS.—The danger from hemorrhage is great and perforation brings about such complications as peritonitis, pleurisy, pneumonia, etc., which greatly diminish the chances of recovery. In uncomplicated cases the prognosis is good but cicatrix formation is slow and the course of recovery is proportionately tedious. According to Anders the average mortality is about 20 per cent.

TREATMENT.—*Hygienic and Dietetic.*—In order to cure these cases it is necessary to put the stomach at rest. This is best secured by keeping the patient in bed, and by feeding as far as possible by the rectum,—exclusively if the stomach is very irritable, or after severe hemorrhage, also as a preliminary to other treatment. By this method of treatment gastric peristalsis and the secretion of hydrochloric acid, which acts as an irritant, are suspended and the ulcerated surface is put in the most favorable condition for repair. Healing is slow and the patient should be prepared to stay in bed a number of weeks at the very least, and it may require months. Hot poultices or compresses should be used over the stomach during this enforced rest and will be found of decided benefit. They should be changed every two or three hours so as to keep them hot and should be held in place by an impervious covering, such as oiled silk or several folds of flannel.

Boardman Reed in treating these cases feeds the patient during the first week by the rectum. The nutrient enemas should be introduced four times or more in the twenty-four hours, according to the tolerance of the bowel. Four to six ounces of the food selected may be administered in this way after irrigation with normal salt solution. Peptonized milk is one of the best nutrients for rectal administration. Others which are satisfactory are pancreatized milk gruel, beef peptonoids, freshly made beef-juice, bovinine, somatose dissolved in milk or water, and raw eggs alone or beaten up with milk. The enema recommended by Boas consisted of 250 Gm. of milk, the yolks of two eggs, a teaspoonful of salt, one ounce of good claret and one tablespoon-

ful of aleuronat flour. If the rectum becomes intolerant the enemas must be stopped for a few hours, after which they may usually be given again without trouble.

After a week of rectal feeding, food may be given, cautiously at first, by the mouth. Peptonized milk, milk and lime water equal parts, egg albumin water, and liquid peptonoids are usually well tolerated. For the next week they should be given in association with the nutrient enemas, in order to supply sufficient nutrition without overworking the stomach. The food should be given in small doses every one to two hours. Thin gruels, meat juices and bouillon and soft boiled or poached eggs may be gradually added, and as the condition of the stomach improves the cereal breakfast foods, smooth finely divided purees made of peas, potatoes or beans and later well cooked non-acid fruits and vegetables. Meat should not be eaten until the patient is entirely well and all acids and condiments should be eschewed. Massage of the body, but not of the abdomen, is valuable. Washing the stomach is sometimes beneficial but requires the utmost caution.

Medicinal Treatment.—To relieve the hyperacidity sodium bicarbonate (½ to 1 teaspoonful) or one of the alkaline sedative mixtures given for hyperchlorhydria is to be prescribed. The alkaline mineral waters, notably Carlsbad, which is rich in sodium sulphate, is given to correct constipation and to reduce the gastric acidity. A teaspoonful of the artificial Carlsbad salt may be taken every morning, upon an empty stomach. Bismuth subnitrate is highly recommended by Fleiner, who uses it as follows: The stomach is first washed out and then 150 to 200 grains of the bismuth suspended in about six ounces of water is introduced through the tube. After a few moments the clear water is drawn off, leaving the bismuth salt in contact with the stomach wall. Hemmeter insufflates the dry bismuth salts into the stomach, with a powder blower. Nitrate of silver is the most popular drug for internal use; $^1/_8$ to $^1/_4$ grain three or four times daily are the usual doses. It may be taken in solution with peppermint water in tablespoonful doses, or in pill form combined with opium or belladonna. The latter drug has the advantage of reducing gastric acidity. Tonic doses of arsenic and the peptonate of iron are indicated if there is decided anemia.

Hemorrhage requires judicial management. Absolute rest in

the recumbent position is imperative. No food or drink should be allowed. Cracked ice is usually allowed, but Hemmeter enjoins even that. It is useful in all cases of vomiting. An ice bag is placed upon the epigastrium and ergot or ergotole (20 to 30 minims) administered hypodermically. To quiet the patient and relieve pain ¼ grain of morphin is to be injected. As a gastric sedative when there is a tendency to vomiting Boardman Reed recommends large doses of bismuth suspended in lime water with a drop of carbolic acid to each dose and followed by spirits of chloroform and compound tincture of cardamom. The head should be kept low and the extremities warm. There is a difference of opinion as to washing out the stomach. Ewald has used ice water for this purpose with good results. Others recommend very hot water. Whether the disturbance incident to the introduction of the tube may not do more harm than good is an open question. Tyson recommends the administration of tannic acid in 15 grain doses every fifteen minutes until bleeding stops. Alum is also used. Great weakness requires the hypodermic use of digitalis and strychnin and excessive loss of blood calls for hypodermoclysis.

Of late years many of these cases of gastric ulcer have been submitted to surgical operation. This is advisable when there is perforation or recurrent attacks.

GASTRITIS, ACUTE; ACUTE GASTRIC CATARRH.

DEFINITION.—An acute inflammation of the mucous membrane of the stomach.

ETIOLOGY.—It may be caused (1) by the ingestion of indigestible, or decomposing food, mechanical irritants, hot or cold drinks and overeating; (2) by toxic substances, such as arsenic, antimony, mercuric chlorid, phosphorus, croton oil, strong alkalies, acids, or other chemical irritants, ptomains and excessive indulgence in alcoholic drinks; (3) by the acute infectious diseases,—scarlatina, measles, typhus and yellow fever; (4) by certain microörganisms,—anthrax bacillus, the favus, thrush and yeast fungi and probably some forms of bacteria, including pus microbes (causing phlegmonous gastritis). Animal parasites, including cheese maggots, ascarides and tapeworm may also be responsible for it.

Predisposing causes are debilitating diseases of the heart, lungs, liver or stomach, rheumatism, gout, malaria,—in fact any disease which depresses the general health.

PATHOLOGY.—The morbid anatomy is that characteristic of any catarrhal inflammation. The tissues become hyperemic, swollen and edematous, with injection of the blood vessels, effusion of serum, minute points of hemorrhage and a free secretion of tenacious mucus which covers and adheres to the surface.

SYMPTOMS.—The severity of the symptoms depends upon the character of the gastric irritant. Soon after eating, in cases of moderate severity, as those caused by fermenting and decomposing food, there is loss of appetite and offensive breath; the tongue is coated with a white, sticky fur and marked by the impression of the teeth; there is severe thirst, water giving some relief to the burning pain in the stomach; often there is a craving for acids. There is a sense of fullness and distention of the epigastrium, diffuse tenderness, and nausea, eructations and pyrosis. Vomiting is not necessarily present in mild cases but in the severe ones it is constant and persistent. The vomitus consists of unchanged or partially digested food, mucus and sometimes bile and a little blood. The organic acids are present in abundance, but there is little or no hydrochloric acid. When the irritation of the stomach is great, as in toxic gastritis, all these symptoms are intensified. Pain is excruciating, thirst is intense and vomiting is incessant, while the constitutional symptoms are proportionally grave.

In addition to the local symptoms there is malaise, despondency, inability to work, headache, vertigo, etc. There is often moderate elevation of temperature (102° to 103° F.) and a weak and rapid pulse. Prostration is marked and in the toxic forms may amount to actual collapse. Herpes labialis is a common cutaneous symptom.

DIAGNOSIS.—The diagnosis of an ordinary attack presents little difficulty. In cases attended with fever its symptoms are not unlike those found at the onset of the acute contagious diseases, but the attack can in most cases be referred to a definite cause, the local symptoms are more marked than the constitutional and the symptoms usually subside within a day or two.

PROGNOSIS.—Usually favorable unless the condition is second-

ary to a severe chronic disease or caused by poisoning with a deadly drug.

TREATMENT.—The first indication for treatment is removal of the exciting cause and the second rest for the inflamed organ. If the irritating matter has not yet been removed by vomiting a mild emetic may be given. The simplest is a draft of warm water; if this is not effective most authors prescribe ipecac (10 to 20 grains of the powder for adults or a dram of the syrup for children) or tartar emetic (1 to 2 grains), but the latter is depressing. Ewald and Boas combine these. All emetics produce some irritation of the stomach and are to be avoided if possible. A better plan is to wash out the stomach with the tube. After doing this thoroughly, Hemmeter disinfects it with the following solution:

Thymol	gr. 8
Boric acid	oz. ½
Warm water	qt. 1

This usually checks the vomiting at once. Six hours later he washes out the colon.

To remove any irritant matter which has passed through into the intestine a mild laxative should be given. Calomel is the most satisfactory in the majority of cases; 5 to 10 grains may be given at a single dose, or better ¼ to 1 grain every hour. In the smaller doses it also has a sedative action upon the stomach, although the larger doses are more powerfully antiseptic. The following is good:

Calomel	gr. 2—4
Powd. ipecac	gr. 1
Bismuth subnitrate	dr. 1

Make 12 powders. One every half to one hour for four to six doses or till the bowels are moved; to be followed by a saline.

An excellent laxative and one tolerated by most stomachs is the effervescing solution of the citrate of magnesia. A bottle may be given in four doses, one every half hour. A Seidlitz powder or Hunyadi, Apenta or other natural aperient waters may be tried.

For the thirst the patient should be given cracked ice only. This also relieves the nausea. For the latter purpose bismuth,

carbolic acid, creosote, cocain, wine of ipecac and calomel in small doses are recommended. The following may be tried:

Creosote	gtt. 4
Bismuth subnitrate	dr. 1½
Mucilage acacia	oz. ½
Peppermint water, enough to make	oz. 2

Teaspoonful every hour.

Or—

Bismuth salicylate	gr. 10
Cocain hydrochlorate	gr. ½
Menthol	gr. 2
Camphor water	oz. ½

To be taken every 2 hours until relieved.—Hemmeter.

In obstinate cases of vomiting associated with pain it may be necessary to resort to hypodermics of morphin (⅛—¼ grain) and atropin ($^1/_{150}$—$^1/_{100}$ grain). Valuable adjuvants both for the nausea and pain are sinapisms, turpentine stupes or hot compresses applied to the epigastrium.

All foods should be withheld for at least twenty-four hours or until the gastric symptoms are entirely relieved. Then milk and lime water, liquid peptonoids, egg albumin and beef broths or bouillon may be given cautiously. The diet should be frugal and carefully selected for some days after the attack. The danger of future indiscretions should be pointed out.

GASTRITIS, CHRONIC; CHRONIC GASTRIC CATARRH.

DEFINITION.—Chronic inflammation of the gastric mucous membrane with consequent impairment of the digestion.

ETIOLOGY.—Predisposing causes are diseases of the heart, liver and lungs which produce venous congestion of the stomach; and nephritis, tuberculosis, anemia, syphilis, malaria, diabetes and gout which lower the vitality or put toxic substances in circulation.

The exciting causes are prolonged errors or indiscretions of diet, such as irregularity of meals, insufficient mastication, bolting of food, over-eating, too coarse or too rich food, condiments and spices, ice-water or hot drinks and especially the habitual and immoderate use of alcohol. Persistence of other forms of stomach trouble may finally terminate in chronic gastritis.

PATHOLOGY.—During the earlier stages of the inflammation the mucosa is found to be hyperemic and swollen. It is covered with a tenacious mucus. In places there may be points of slight hemorrhage as the result of the venous stasis. As the disease progresses there is an increase of the connective tissue elements. The tubules are at first swollen and filled with disintegrated epithelial remnants and may in places be converted into cysts. As a result of the overgrowth of connective tissue the glands are compressed more and more and many of them are finally obliterated. Usually in advanced cases there is atrophy of the stomach wall. Rarely, on the other hand, the submucous and muscular layers become greatly thickened. Ulcers may form upon the mucous surface. The inflammatory process is most severe in the neighborhood of the pylorus.

SYMPTOMS.—In order to understand the clinical picture of the disease it is necessary to know something of the changes in the gastric secretions. The most important is the reduction in the amount of hydrochloric acid and of the ferments, pepsin and rennin. The hydrochloric acid is not only necessary to the digestion of the proteids but is a valuable germ destroyer, therefore checking the tendency to fermentation when there is stagnation of food. To produce this stagnation another important factor in the causation of the disagreeable symptoms is present —deficient motility. If the stomach empties itself with reasonable promptness the disease may not cause special discomfort providing intestinal digestion is unimpaired. In practically all cases the hydrochloric acid is diminished, though Boas described a form of the disease in which it is normal. In advanced cases when there is atrophy of the secreting glands the hydrochloric acid may be entirely absent. The ferments may also disappear at this stage. Another practically constant symptom is the presence of mucus. This is often very profuse, coating the mucous surface, covering the food and interfering with the action of the gastric juices. But in advanced cases of atrophic gastritis the secretion of mucus may also cease.

The tongue is usually coated most thickly at the back, it is broad and flabby, its papillae are enlarged and its tip and edges red. This symptom, however, is not constant. There is a bad taste in the mouth, especially in the morning, a perversion of

taste, a loss of appetite, alternating with normal or increased desire for food, a craving for acids and salty articles, increased thirst and salivation. After eating there is a sense of fullness and distress, diffuse tenderness and a dull burning pain.

Nausea is a frequent symptom, coming on before or after eating or even when the stomach is empty; this is due in part to the absorption of ptomains. There are often eructations of gas which may be odorless or offensive, and some of the contents of the stomach may be regurgitated. This is acid from the presence of the organic acids (lactic, butyric and acetic), or bitter from peptones and frothy from fermentation. This fluid may cause heartburn. There is vomiting in many cases; this symptom is particularly prominent in alcoholic gastritis. In this form of the disease it usually occurs in the morning soon after rising, the patient throwing up a quantity of frothy fluid and much clear, tenacious mucus. If there is much retching it may be blood stained, especially in those cases due to secondary venous stasis. In simple forms of the disease vomiting may occur after eating, either directly or within one or two hours. In such cases the vomitus contains a larger percentage of partially digested food. Sarcinae, yeast fungi and bacteria are also found in the stomach. When motility is diminished the food is detained in the stomach for hours, undergoing fermentative and putrefactive changes. When it finally passes the pylorus it causes colicky pains and gaseous distention of the abdomen.

The general symptoms include headache, depression of spirits, mental torpidity, cardiac irregularities, insomnia, with disturbing dreams, constipation and a highly colored and concentrated urinary secretion.

The general health may not suffer greatly unless there are *complications*. The most common and important of these is the extension of the disease to the intestine. If this occurs, the whole digestive tract being at fault, the elaboration and absorption of food is greatly interfered with and the patient's nutrition suffers. He becomes weak, emaciated, cachectic and anemic. If the duodenum is the seat of trouble, jaundice may ensue. A catarrhal inflammation of the large intestine causes diarrhea.

Diagnosis.—The symptoms of greatest diagnostic value are (1) a reduced quantity or absence of hydrochloric acid; (2)

the presence of mucus; (3) the ferments pepsin and rennin and the proenzymes (pepsinogen and rennin-zymogen) are reduced in quantity or absent.

In a typical case of simple or mucous gastritis all these symptoms are present. In complete atrophic gastritis, the secreting surfaces being destroyed, there is naturally no secretion of mucus, no hydrochloric acid either free or combined, and no enzymes or proenzymes. In acid gastritis (so-called) there is a normal or increased amount of hydrochloric acid and ferments *with mucus*. This is properly a neurosis, not a true inflammation.

For the purpose of assisting in the differentiation of the forms of stomach disease with which chronic gastritis may be confused the following table is added:

CHRONIC GASTRITIS.	GASTRIC NEUROSES.	GASTRIC ULCER.	GASTRIC CANCER.
Most common in middle-aged or elderly persons.	Most common in young adults.	Most common in young adults, especially women.	Most common after middle life.
Diffuse pain, increased by taking food; slight diffuse tenderness.	Diffuse tenderness, often relieved by taking food; epigastric tenderness.	Well defined point of pain and tenderness in epigastrium; pain running through to back.	Constant pain radiating, often severe, not much affected by food; slight tenderness.
Often vomiting, in morning in alcoholics; eructations, often offensive.	Vomiting not a prominent symptom; odorless eructations.	Vomiting may be present or absent; often blood-stained.	Vomiting common.
No hemorrhage; vomitus may be slightly blood-streaked.	No hemorrhage.	Hemorrhage common and often abundant.	Slight hemorrhage common; coffee-ground vomit.
Bowels usually constipated; may alternate with diarrhea.	Bowels constipated.	Bowels constipated.	Obstinate constipation.
Hydrochloric acid constantly reduced or absent.	Hydrochloric acid usually increased; may be reduced or absent but not constantly,—alternating with excess.	Hydrochloric acid increased.	Hydrochloric acid usually absent.

CHRONIC GASTRITIS.	GASTRIC NEUROSES.	GASTRIC ULCER.	GASTRIC CANCER.
Ferments reduced.	Ferments normal or increased, even with anacidity.	Ferments normal.	Ferments decreased or absent.
Lactic and fatty acids not present after test meal.	No organic acids.	No organic acids.	Lactic acid present after test meal.
No tumor.	No tumor.	Rarely tumor at pylorus.	Generally a tumor.
No dropsy.	No dropsy.	No dropsy.	Often edema of ankles.
General symptoms come on slowly, producing emaciation, debility and cachexia.	General symptoms of neurotic type, irregular and variable; often emaciation but no cachexia.	General symptoms of neurotic type; may be great anemia from hemorrhage.	Rapid development and loss of strength, emaciation, continuous pain, marked cachexia; death within a year.

PROGNOSIS.—This is to a certain degree dependent upon the cause; serious diseases of the heart, liver or lungs increase its gravity. Uncomplicated cases, without atrophy of the mucous membrane, may often be cured by proper treatment and with attention to the diet and habits. If there is atrophy of the glands complete recovery is impossible, but the general health may not suffer greatly if intestinal digestion is good; extensive atrophy may, however, by preventing proper nutrition, produce severe anemia even of the pernicious form.

TREATMENT.—The removal of the cause or the modification of the different factors entering into the production of chronic gastric catarrh should be attempted in every case. If it is due to irregular meals, too coarse or too stimulating food, overeating or bolting of meals the patient should be advised to change his custom in these respects. Overindulgence in alcohol should of course be forbidden. Diseases of the heart, liver and kidneys should receive proper attention. In these cases there is a venous stasis which produces gastric disturbance. The latter, Hemmeter points out, may often be relieved by digitalis, in spite of its likelihood to disorder the stomach. Strychnin should also be used. In liver disease an occasional mercurial,

with morning doses of natural mineral water, are generally expedient in view of the attendant constipation.

Hygienic and Dietetic.—These patients require light outdoor exercise, such as walking, riding, bicycling, sea-bathing, boating, etc., but always stopping short of exhaustion. Indoor gymnastics and massage may supplement or take the place of this in certain instances. Change of scene, sea voyages and trips to seashore and mountain help to distract the mind of the patient and prevent the mental depression characteristic of the disease. Hydrotherapy is always of value. If the patient's strength is fairly good a sponge or shower bath followed by vigorous friction should be employed. If there is hepatic trouble Stockton considers the cold pack over that region decidedly valuable as a stimulant to the liver. Flannel should be worn next the skin; the abdominal bandage gives decided comfort.

Before prescribing a diet for a patient with gastric catarrh he should be carefully interrogated as to his likes and dislikes and as to what foods are known to disagree with him. The diet list should be arranged accordingly, so far as possible. The contents of the stomach, following a test meal, should of course be carefully examined as a basis for dietetic treatment. At the beginning it is usually wise to give liquid food only, in small quantities frequently administered. Milk taken warm is usually selected. It may be diluted with Vichy, limewater or any good carbonated water, and a little salt added. At first two ounces are administered every two hours and the quantity gradually increased until one to two quarts are taken daily, the intervals between meals being slowly increased. Skimmed milk, buttermilk or koumiss are sometimes more easily digested and more agreeable to the patient. Watch should be kept of the stools for the appearance of undigested casein; milk may be peptonized in cases where this appears, before changing the diet, if this is thought best. Instead of milk, meat soups and bouillon, which may be made more nutritious by the addition of the white of egg, the albumoses (somatose, nutrose or beef-meal), or liquid peptonoids, panopepton, beef juice or similar concentrated foods may be given.

As the digestion improves the dietary may be enlarged. Its character will depend somewhat upon the amount of HCl and

pepsin. If this is moderately abundant the proteids are given in considerable quantity. Such are the white meats, soft cooked or raw eggs, oysters, dry or toasted bread, zwieback, granose and the finer breakfast cereals which should be thoroughly cooked. Oatmeal is objectionable and the coarser grains and unbolted flours of all kinds are contraindicated. Well broiled steak, fish and other lean meats, carefully cooked and well minced before eating, are usually permissible. All food of this kind, indeed of any kind, must be well masticated. Certain vegetables, such as peas or beans, may be taken in the form of purees. Rice is allowable in most cases and potatoes, if well cooked. The effects of farinaceous foods must especially be watched. If flatulence develops they must be suspended for a time. The frequence of the meals will depend upon the character of the case. Some patients do best upon small meals taken at short intervals. In others two meals daily give better results, because they permit longer intervals for rest.

Foods to be avoided are condiments, pastries, hot breads, sweets, coarse vegetables and cereals, acid fruits and fats and oils of all kinds. The latter notably reduce the secretion of hydrochloric acid.

Of the drinks, the best is hot water taken half an hour before eating. At meal time as little fluid as possible should be drunk. Tea and coffee often disagree and should not be permitted. Cocoa is generally permissible, and the "cereal coffees" now so abundant are as a rule well tolerated and agreeable. Alcoholic drinks are decidedly deleterious in most cases and should not be permitted if it can be helped. In chronic drinkers, for obvious reasons, a certain amount of spirits must be permitted. In cases in which there is positively no fermentation Hemmeter permits Oporto, Malaga and Tokay wines.

Dietetic treatment of the constipation is usually all that is necessary. A glass of cold water night and morning, koumiss or buttermilk twice daily and a breakfast containing prunes, figs, a baked apple or some similar fruit will usually have the desired result. Colon flushings must sometimes be resorted to, or enemas of olive oil ($\frac{1}{2}$ pint).

Lavage is of great value in cases of chronic gastritis in which there is much mucus or stagnation of food. The fre-

quence with which it must be employed depends upon the severity of the case. Usually once daily is sufficient. The best time is when the longest period of rest will follow, but some hours after eating in order to allow reasonable time for digestion. In severe cases, especially if there is dilation, it may be expedient to wash out the stomach two or three times a day in order to free it of decomposing fragments. Night and morning are the best times. To aid in the solution of mucus common salt or sodium bicarbonate are added to the water. Hemmeter uses one tablespoonful of salt and two tablespoonfuls of soda to each quart. Various antiseptics may be used through the tube for their local effect after the stomach has been cleansed by lavage. Weak solutions of hydrochloric acid, boric acid, thymol, salicylic acid, etc., are used for this purpose. A 2-per-cent solution of alum or 1 per cent of tannic acid is recommended in mucus gastritis. Nitrate of silver is considered one of the most valuable drugs for its effect upon the gastric mucosa, and this is also used by lavage in solution (1 to 2000) or by the intragastric spray (1 to 1000).

Medicinal treatment aims to restore (when possible) the gastric chemistry to a condition approximating that of the healthy stomach. Hydrochloric acid is therefore prescribed, not only to replace the deficit but in order to change pepsinogen into pepsin and to prevent fermentation of food. It is usually given in too small doses. At least 15 minims should be taken, well diluted and repeated in a quarter to half-hour if necessary. It should be taken through a glass tube. Clinicians now quite generally doubt the efficacy of pepsin, but it is useful in cases of chronic gastritis if anywhere. At least 5 grains should be taken at a dose with the hydrochloric acid about half an hour after eating. Pancreatin should not be prescribed with hydrochloric acid, but may be used when the latter disagrees. It should be taken with an alkali, half an hour after eating, in order to substitute an artificial pancreatic digestion for the normal acid one; 5 grains each of pancreatin and sodium bicarbonate may be administered in capsules or tablets. When the appetite is poor the bitter tonics are decidedly valuable. Tincture nux vomica (5 to 15 minims), the fluid extract of condurango (1 dram), tincture quassia (½ to 1 dram), tincture calumba (1 dram), compound

tincture gentian (1 dram), or cinchona (1 dram) are the common remedies and are taken before meals, alone or with an alkali (as sodium bicarbonate), or better still, in atonic states, one-half hour after eating, with the hydrochloric acid. The following is a suggested prescription:

Tincture nux vomica.....dr. 1 to 2
Dilute hydrochloric acid.....dr. 3 to 4
Elixir gentian, enough to make.....oz. 6

Tablespoonful well diluted to be taken through a glass tube.

When there is constipation the addition of 15 to 20 drops of fluid extract cascara sagrada adds to the value of the mixture.

Orexin in 5 grain doses half an hour before eating is also a good remedy for anorexia. It may be taken in bouillon.

We have already referred to the value of nitrate of silver solution in lavage. The drug may also be used in the form of a pill ($\frac{1}{8}$ to $\frac{1}{4}$ grain). Anders prefers the following:

Silver nitrate .....gr. 4
Ext. hyoscyamus .....gr. 8

Make 16 pills. Take one about an hour before each meal, the stomach being first prepared by rinsing with a 2-per-cent solution of borax and water.

Hemmeter gives it with peppermint water:

Silver nitrate .....gr. 5
Peppermint water .....oz. 4

Tablespoonful three times a day on an empty stomach.

Another much vaunted remedy is bismuth subnitrate in very large doses (1 to $1\frac{1}{2}$ drams). It is said to be peculiarly applicable to cases in which there is much mucus and especially in alcoholic gastritis. It is, however, constipating and requires the use of laxatives.

If constipation fails to yield to the dietetic measures already described medicinal treatment is indicated. An occasional mercurial followed by the laxative saline waters gives good results, especially if there is liver trouble. The treatment of gastritis at the Carlsbad, Ems, Kissingen and other spas depends upon a free use of those waters with careful supervision of the diet and habits. It often produces marvelous results. The natural aperient waters from these springs are available, also Apenta, Freidrichshall, Hunyadi, Saratoga and Bedford waters.

Electricity, both galvanic and faradic, used externally and by the intragastric electrode gives undoubted benefit in most cases, though it is doubtful if it modifies the secretion.

Vomiting is sometimes an inconvenient symptom. It is usually relieved by diet, but may require other treatment, as lavage, for the removal of the source of irritation. Resorcin or creosote in small doses will check fermentation if that is the cause. Cerium oxalate, cracked ice and champagne are common remedies. Spraying the stomach with menthol and cocain is also applicable as a remedy.

For pain rest in bed, hot fomentations, the hot-water bag or sinapisms to the epigastrium and galvanism will usually bring relief. Opiates must be avoided.

GASTROPTOSIS AND ENTEROPTOSIS.

DEFINITION.—The term gastroptosis signifies a prolapse or downward displacement of the stomach. In many, probably most cases, there is at the same time a descent of other abdominal organs, including the liver, kidneys, colon, spleen, etc. This condition is called enteroptosis or splanchnoptosis.

ETIOLOGY AND PATHOLOGY.—Visceral prolapse is probably much more common than is generally believed. Recently Einhorn reported (Med. Record) that in a total of 1,912 cases treated by him during 1900, 347 or 18.15 per cent showed some degree of splanchnoptosis. Of these 6.5 per cent were males and 33.25 per cent females. These percentages accord with those given by Glénard, the discoverer of the disease. The underlying cause of enteroptosis is weakness of the abdominal wall, muscles or suspensory ligaments, or bony deformity. This condition may be either congenital or acquired, but in the majority of cases there is undoubtedly congenital weakness. This has been pointed out by Kussmaul, Rosengart and others who have shown that in this disease there is either arrest of development or reversal to the fetal type. For instance, the infant's stomach is nearly vertical and the ascending and transverse colons run diagonally upward, across the abdomen to the left. This is the position in which these organs are found in enteroptosis, at least in many cases. Other congenital abnormalities which are frequently pres-

ent are the floating tenth rib described by Stiller and the elongated or funnel-shaped thorax—the phthisical chest. Rose (N. Y. Med. Jour.) places considerable emphasis on the latter condition as an etiologic factor. Rhachitic changes in the skeleton also tend to produce ptosis.

Of the exciting causes, tight lacing is usually considered the most important. This not only pushes down the stomach but may "double it up," causing approximation of the cardia and pylorus, thus transforming it into a pendulous sack. In 150 cases of pelvic disease Kellogg found displacement of the stomach and bowels in 138. The ptosis may also follow frequent pregnancies, debilitating diseases of any kind which produce general muscular weakness and a rapid loss of the abdominal fat occurring in persons who have been obese. It is possible, also, that ptosis may be caused by traumatisms or by displacement of the female genito-urinary organs.

As already stated, downward displacement of the stomach is nearly always associated with ptosis of other organs. For instance, in the 347 cases reported by Einhorn, gastroptosis occurred alone only twice. Yet in 212 of these cases there was movable kidney. This indicates an important factor in the pathogenesis. The kidney is loosely covered by peritoneum and easily becomes displaced. The right kidney is usually affected (77.3 per cent of Einhorn's cases); by its attachment to the ascending colon this is pulled downward, dragging the stomach after it by means of the gastrocolic ligament. Hemmeter is disposed to lay great emphasis upon the descent of the liver, asserting that "all diseases in the liver itself that lead to its enlargement and descent will eventually lead to enteroptosis," since prolapse of this organ must force the adjacent organs from their normal positions.

Symptoms.—Gastroptosis may produce no symptoms, but if the prolapse is great or after it has existed some time, these are likely to appear. The patient usually complains of digestive trouble—loss of appetite, a sense of fullness or of dragging in the epigastrium, pain of a colicky nature at irregular intervals, flatulence, eructations, sometimes nausea and vomiting, constipation, etc. Not infrequently the prolapsed organ becomes dilated, but this is by no means constant. There may be a sense

of weakness or faintness upon arising in the morning, fatigue upon walking, backache and weight in the lower part of the abdomen. These patients are usually decidedly neurasthenic and often become anemic and debilitated.

PHYSICAL SIGNS.—The patient is thin, the abdominal muscles flaccid and there is protrusion of the lower part of the abdomen with a concavity in the epigastric region. Often the pulsation of the aorta is readily palpable because the descent of the stomach has left it uncovered. The transverse colon may be found as a ribbon-like body, just above the symphysis

A splashing sound may be heard over the stomach when it contains fluid. Its outlines may be mapped out as directed under Gastric Dilation by inflating it with gas or air, or by the use of the flexible sound, the gyromele, the gastrodiaphane or the X-ray.

DIAGNOSIS.—A study of the signs and symptoms usually makes diagnosis easy. As an aid to diagnosis Einhorn recommends Glenard's "belt test," as follows: "The physician, standing behind the patient, encircles the lower part of the abdomen of the latter with both his hands, at the same time supporting and partly lifting it. The patient is now asked if this procedure gives him relief. If so, it speaks in favor of the presence of enteroptosis."

PROGNOSIS.—Good as regards life but complete cure is certainly unusual.

TREATMENT.—Since tight lacing undoubtedly causes gastroptosis and enteroptosis this custom should be vigorously combated by all physicians. Tight waistbands and belts and the hanging of heavy skirts from the waist are also injurious. Following confinement, it is wise to wear a properly fitting abdominal binder until the integrity of the relaxed muscles is restored. Weakness of the abdominal muscles may be corrected by gymnastic exercises, swimming, bicycling, massage, and external and intragastric faradization and galvanization. Rolling a five or six pound cannon ball upon the abdomen is believed by Rose to be more effective than massage. Cold hydrotherapeutic applications add to the muscular tone.

The greatest relief is secured by wearing a properly fitting bandage which will compress and lift up the lower portion of

glandular elements proper are affected; in the fibrous form there is an increase of connective tissue; in the vascular variety there is dilation of the arteries or veins, or both; in the cystic goiter large cysts are formed, filled with liquid or colloid matter (in the latter case it is called a colloid goiter); in the amyloid form there is a wax-like product; and in the calcareous form, usually old goiters, there is a deposit of the lime salts.

Symptoms.—The patient is more likely to complain of the unsightly appearance of a goiter than of any discomfort which it may cause. When it has become sufficiently large it may produce some compression of the trachea and of the nerves of the neck, thus interfering with respiration and producing alteration of the voice, pain behind the ear and cramps of the neck muscles. These symptoms are likely to be less pronounced in the large pendulous goiters than in those of moderate size which encircle the throat and reach down into the space behind the sternum. Pressure upon the great vessels may cause swelling of the neck, cyanosis of the face and symptoms of disturbed cerebral circulation. The general health is generally unaffected, but there may be pronounced nervous symptoms. Adami points out that persons having large goiters are dull, torpid and of low mental power, calling to mind those suffering from myxedema. On the other hand, there are cases presenting psychical disturbances, as mental irritability, anxiety, unrest, insomnia, etc., the symptoms resembling those of exophthalmic goiter. Shepherd has shown that these symptoms often disappear when nodular masses are removed.

Diagnosis.—A goiter can hardly be mistaken for anything else. (See Exophthalmic Goiter for the differential diagnosis from that disease.)

Prognosis.—Good. Neither length of life nor health is affected unless the goiter produces great pressure upon the important structures of the neck. Rarely this is the case and sudden deaths have been the result.

Treatment.—Medical treatment does not usually produce very good results. Potassium iodid internally and iodin externally are the drugs most used. Schaefer got his best results with the following prescription:

Iodin (crystals) ..... gr. 2
Potassium iodid ..... gr. 4
Rectified spirits ..... dr. 1
Simple syrup ..... dr. 1
Distilled water, enough to make ..... oz. 2

Teaspoonful in a wineglassful of water one hour after each meal.

After two weeks of this treatment an iron tonic is given and strychnin and calisaya may be administered if weakness shows their necessity. The iodin may in such cases be discontinued for a week or two. In three weeks of this treatment Dr. Schaefer finds improvement; after six months some goiters disappeared.

Ergot and belladonna in gradually increasing doses have been recommended for the vascular form of the disease.

Recently, desiccated thyroid in tablets, or the fresh gland, has been used in these cases. Considerable diversity of opinion is found as to its merits, but it certainly sometimes proves of benefit. Adami thinks it most useful in early cases and in the softer parenchymatous forms, whether diffuse or nodular. Iodothyrin is an excellent substitute for the thyroid, is less disagreeable in its effects and gives fully as good results. Mosse used 4½ grains per day of this drug over an extended period.

The simplest local application is to paint the surface over the gland with tincture of iodin. The official red iodid of mercury ointment is also used, a small quantity being rubbed in daily. The strength is usually reduced. Gross used:

Mercuric iodid ointment ..... dr. 1
Vaselin ..... dr. 7

Dr. Chavette claimed remarkable results from the following remedy:

Zinc sulphate ..... dr. 2
Salicylic acid ..... dr. 2
Iodoform ..... dr. 2
Boric acid ..... dr. 3
Oleic acid ..... oz. 8

Keep at a boiling heat for several hours, then pour off the liquid and bottle when cold. Sig.: Apply to the enlarged gland with slight friction twice daily until a slight desquamation occurs; after this apply only once daily until the enlargement is entirely reduced.

Injections into the parenchyma of the gland sometimes deci-

dedly reduces its size. Tincture of iodin has been used for that purpose, also carbolic acid, 10 to 20 minims of a 5-per-cent solution once or twice weekly on alternate sides, and iodoform. The following formula is recommended for the latter by Mosetig-Moorhof:

Iodoform	part 1
Ether	parts 5
Olive oil	parts 9

Commence with 15 minims and increase the quantity as necessary. Inject every five to eight days. Five to ten injections are necessary to effect a cure.

Injections are useless in the cystic form unless the fluid is first evacuated. Iodin or carbolic acid may then be introduced into the cavity. If this fails after a fair trial the cysts should be enucleated. Thyroidectomy, or partial excision of the gland, may be demanded in some cases.

GOITER, EXOPHTHALMIC.

DEFINITION.—A disease of the thyroid characterized by enlargement of that gland, prominence of the eyeballs, rapidity of the pulse and muscular tremors.

ETIOLOGY.—It occurs much more frequently in women than in men,—usually between the fifteenth and thirtieth years. It is often hereditary and several cases may occur in the same family. Sudden fright, grief, anxiety, fatigue or mental shock and the acute infectious diseases, as rheumatism, influenza or typhoid fever, may act as exciting causes. Various theories have been proposed to explain its causation. According to one it is a neurosis; another is that it is an affection of the medulla oblongata; a third, the one generally held at the present time, is that it is due to the irritant action upon the central nervous system of a perverted or increased secretion of the gland. This theory is supported by the antithesis between the symptoms of this disease and myxedema, in which the normal glandular action is wanting, and the fact that it is aggravated by the internal administration of thyroid. Inglis suggests that this irritant secretion may not only be responsible for the nervous symptoms but also for the increased size of the gland. The cause of this

hypersecretion is not explained, though the theory has been offered that an autotoxemia from the intestinal tract may be responsible for it.

PATHOLOGY.—The gland usually shows uniform parenchymatous enlargement, the secreting structures being principally affected. No uniform changes have been found in the nervous system. Askanzy found involvement of practically the whole muscular system. He thinks this explains the muscular weakness and thinks it due to toxemia. The exophthalmos may be due to weakness of the ocular muscles. The heart may be hypertrophied, dilated or perfectly normal.

SYMPTOMS.—The cardinal symptoms, as stated in the definition, are tachycardia, tremors, exophthalmos and thyroid enlargement. These are often noticed simultaneously, but in some cases the cardiac symptoms appear first and the others follow in about the order given. Rarely goiter may be absent, or it may occur long after the other symptoms.

Palpitation of the heart attracts especial attention, the pulse varying from 90 to 160 and being greatly accelerated by exertion. The heart sounds are loud and audible to the patient, the cardiac impulse strong, but the pulse rather weak. Upon auscultation systolic murmurs may be heard at the base of the heart and sometimes at the apex in cases of mitral and tricuspid insufficiency. The violent action may induce hypertrophy or dilation.

Tremor is present in the voluntary muscles, has a rate of eight or nine to the second and is most noticeable in the hands, although the whole body may be affected by it. It is usually bilateral, but where the goiter is confined to one side it may be unilateral.

Exophthalmos, or protrusion of the eyeballs, varies greatly. It is due to vascular distention and later in the disease may become permanent from an accumulation of fat behind the globe. Pulsations of the retinal vessels may be seen with the ophthalmoscope. The condition gives a peculiar staring expression which is likely to attract attention early. Exophthalmos may be unilateral.

Von Graefe's sign is present in many cases, but is not invariable. It consists of inability of the upper lid to follow the movement of the eye when looking down or up, as it normally

should. Widening of the fissure between the lids (Dalrymple's sign), due to muscular retraction, is frequent, and Mobius has called attention to the lack of convergence. Winking is not so frequent as in health. The sight is generally good.

The goiter is usually of moderate size and is never large and pendulous, as is sometimes the case in the simple form. Upon palpation, pulsation and a distinct thrill are felt. Auscultation over it reveals a well marked murmur or *bruit*. The size of the thyroid varies considerably under different conditions. Following nervous excitement or overexertion it may become decidedly larger. Enlargement is usually symmetrical, but it is occasionally unilateral; in such cases, exophthalmos and tremor may be confined to one side.

Nervous symptoms are prominent. These include irritability, restlessness, headache, neuralgia, insomnia, alternating mental excitation and depression, and very rarely mania. There is often generalized muscular weakness.

Attacks of vomiting and diarrhea sometimes occur. Excessive sweating is another frequent symptom. Less common are pigmentations of the skin, polyuria, albuminuria and edema of the feet and ankles. There is generally acceleration of the respiration. Anemia and loss of weight are common results.

Diagnosis.—Little difficulty attends the diagnosis of a typical case of exophthalmic goiter. In a recent contribution upon this subject Adami points out the difficulty of fixing a clear line of division between simple and exophthalmic goiter. The diseases of the thyroid make a scale in which cretinism, with absence of secretion, stands at one extreme and exophthalmic goiter with hypersecretion at the other. Midway between is the simple goiter or bronchocele producing no general symptoms, while the secretion is only sufficient for the needs of the body. In certain cases of this variety, however, Adami believes there may be an accumulation in the gland of colloid material, which under the increased activity produced by overwork, excitement or strain is discharged into the body and produces the symptoms characteristic of exophthalmic goiter.

Prognosis.—The disease is essentially a chronic one, but there is in most cases a final subsidence of symptoms and recovery, but with a tendency to relapse. It is rarely fatal, although

a few cases have been reported which ended in death. These were generally due to heart failure.

TREATMENT.—*Hygienic.*—In severe cases rest in bed for a time is advisable; during this period the patient's health may be improved by suitable diet, supplemented by massage and hydrotherapy. The wet pack is decidedly useful and ice-bags applied to the precordium decrease the tumultuous action of the heart. Some cases are benefited by change of climate with moderate elevation. Excitement or fatigue should be avoided, but mild systematic exercise and something to employ the mind are better than idleness, which produces the habit of introspection, which tends rather to increase the nervous symptoms.

Bartholow says: "No single remedy has seemed to me so useful as electricity in the form of galvano-faradism. I have usually applied the descending static current so as to include within the circuit the pneumogastric and cervical sympathetic nerves."

Medicinal Treatment.—Heart tonics, as digitalis, strophanthus and spartein, and heart sedatives, as veratrum viride and aconite, have been much prescribed in exophthalmic goiter, mainly on empirical grounds. They are now little used. Cardiac tonics are indicated in severe or advanced cases when there is danger of heart failure. Ergot is used to contract the blood vessels. Belladonna is considered of value given in large doses, as a sedative and antispasmodic, and the bromids and valerian for the relief of nervous excitement. Two cases were cured by Anders with the following prescription:

Ext. digitalis	gr. 4
Ext. ergot	dr. ½
Strychnin sulphate	gr. ½
Iron arsenate	gr. 2

Make 24 capsules. One three times a day after meals.

Thompson prefers tincture strophanthus, 8 drops three times a day, after meals.

In addition to the use of galvano-faradism Bartholow treated a number of patients with the following: To promote nutrition and prevent intestinal fermentation they were given capsules containing each 40 minims of cod-liver oil and 1 of creosote.

When the cardiac symptoms were pronounced he used the following, iron and manganese being given for the coexistent anemia:

Spartein sulphate .....dr. 1
Picrotoxin .....gr. 1
Manganese sulphate, dried.....dr. 1
Ferrous sulphate, dried.....dr. 1

Make 60 pills. One pill three times a day.

In the more chronic cases where there is fibroid degeneration of the thyroid he recommends the following, basing its value upon the presence of iodothyrin in thyroid tissue:

Sodium iodid .....dr. 5
Sodium bromid .....dr. 5
Sodium arsenate .....gr. 1
Distilled water .....oz. 4

Teaspoonful in water three times a day.

The bromids, when used, must be given in doses of 1 to 2 drams daily. The following may be tried:

Potassium bromid .....dr. 4
Elix. ammon. valerian.....oz. 4

Two teaspoonfuls in water four times a day, increased if necessary.

Sodium salicylate (10 grains four times a day) and sodium glycero-phosphate (20 grains four times a day) have produced good results.

If the disease is due to intestinal toxemia, the antiseptic drugs are indicated; indeed, some undoubted cures have followed this method of treatment. Guaiacol (5 grains), salol (2 to 5 grains), sodium and zinc sulphocarbolates (5 to 15 grains), resorcin (5 grains) and benzonaphthol (5 to 10 grains) are good drugs of this class. For the diarrhea, which is a frequent symptom, a combination of one of these drugs with large doses of bismuth and small ones of opium is indicated, as:

Salol .....dr. ½
Dover's powder .....dr. ½
Bismuth subnitrate .....dr. 4—6

Make 12 powders. One every two to four hours.

This treatment, with an occasional dose of calomel, followed by salines, colonic irrigation and a carefully regulated diet, should serve to put the digestive tract in an aseptic condition.

Glandular therapy has been tried with varying success. Thyroid usually aggravates the symptoms except in late cases pre-

senting myxedematous symptoms and associated with a degenerated condition of the gland. Solis-Cohen reports success from suprarenal gland. Thymus has also been used.

Surgical treatment proves curative, but is attended with considerable danger. In 190 cases collected by Starr 74 were cured, 45 improved and 23 died immediately after operation.

GONORRHEA; URETHRITIS; CLAP.

DEFINITION.—Gonorrhea is a contagious disease of the genital organs in male or female, characterized by an acute or chronic inflammation of the urethral and adjacent mucous membranes.

VARIETIES.—For convenience we may classify the disease as (1) acute, subdivided into (a) anterior and (b) posterior; and (2) chronic.

ETIOLOGY.—Specific urethritis, or gonorrhea proper, always owes its existence to infection with the gonococcus of Neisser. (See Appendix for its description.) The disease is almost invariably communicated during coitus. Very rarely infection is due to towels, dressings, instruments, clothing and other articles stained with gonorrheal pus. Undoubtedly cases have occurred from using the seats of public water closets, but the history which reports no other method of infection than this is likely to be viewed with some suspicion.

Non-specific urethritis may be caused by the use of irritant injections, traumatism, violent exertion, sexual or alcoholic excesses, contact with irritating discharges, constipation, gout, rheumatism and various debilitating diseases. These cases usually run a very mild course and yield readily to treatment, but the symptoms may be as severe as those found in true gonorrhea.

PATHOLOGY.—The invading gonococci which are deposited upon the urethral mucous membrane undoubtedly find their way beneath its surface epithelium to its deeper areas, and even to the upper layers of the underlying connective tissue. Here their presence and proliferation causes irritation and sets up an acute hyperemia with dilation of the blood vessels, leukocytic infiltration and edema, which narrows the calibre of the urethra and produces a scanty mucus discharge, due to stimulation of the urethral glands. This discharge rapidly changes

in character, becoming profuse and purulent from destruction of epithelium. The glands and follicles are affected early in the attack. They may sometimes be felt as shot-like nodules, in the corpus spongiosum along the course of the urethra. If the gland openings become plugged cyst abscesses may be formed. These may break and form ulcers, or become diverticula of the urethra, unreached by local treatment and explaining the persistency of some attacks of the disease. As a result of an acute attack of gonorrhea there may be left behind erosions, granulating patches, ulcerative spots or diverticula. Connective tissue formation may impinge upon the lumen of the bowel and produce a stricture. Meanwhile, a local hyperemia will be maintained, favoring the persistence of the gonococci and easily lighted into renewed activity by excesses in wine or venery. Enlargement of the inguinal glands may occur, but suppuration (bubo) is not common in gonorrhea.

ACUTE GONORRHEA.

Symptoms.—*Acute Anterior Urethritis.*—The first evidences of the disease appear, as a rule, within three to seven days after infection. Sometimes the period of incubation may be less than three days; very rarely is it more than fourteen days (Taylor). The prodromic symptoms, lasting a day or two, are a sense of itching or heat at the meatus, which is slightly reddened, some discomfort caused by urination and a scanty gelatinous secretion which glues together the urethral lips. These symptoms may be so slight that they are entirely ignored until the acute stage is sharply ushered in. The symptoms of itching and burning are now intensified; the urethral opening and the surrounding portion of the glans become red and swollen and its lips everted. The entire end of the penis may be inflamed and the frenum and prepuce edematous, causing decided discomfort or pain and sometimes, when there is a redundant or tight prepuce, phimosis or paraphimosis.

The discharge is at first scanty and nearly colorless, but soon becomes more opaque, and finally changes into a thick, profuse greenish-yellow pus which is sometimes streaked with blood. Hemorrhage may occur after urination but is generally slight. Pain on urinating becomes much more severe and at times is

fairly agonizing, so that the patient postpones emptying the bladder as long as possible. With the subsidence of the congestive symptoms and establishment of discharge it becomes somewhat less severe. It is due to the stretching of the inflamed mucosa of the narrowed urethra and to the irritant character of the acid urine. The stream is frequently twisted, small or otherwise irregular or the urine may be voided with great difficulty, drop by drop. A slight rise of temperature is usually present. There is more or less accompanying pain in the groin, perineum and testes, walking is painful, and the patient rises and sits down with caution.

Chordee, or painful involuntary erection, is a most troublesome but frequent symptom during this stage. On account of the non-participation of the inflamed corpus spongiosum in this process the erect organ is bent or arched like a bow.

During the second week the inflammatory process usually reaches its acme. This is followed by a stationary stage usually lasting a week or more and marked by profuse purulent discharge. The symptoms now begin to decline, the secretion becomes less and less abundant, thinner, colorless and in favorable cases disappears entirely.

In the acute cases of gonorrhea the inflammation is usually limited to the anterior two or three inches or pendulous portion of the urethra, but the infective germs may find their way upward beyond the bulb and attack the membranous and prostatic portions. The result is an acute posterior urethritis.

Acute Posterior Urethritis.—Usually the first symptom of involvement of the posterior urethra is cessation of the discharge from the meatus, occurring in the course of an acute gonorrhea. The patient will notice that following this he desires to urinate more frequently than before. After urination there is more or less pain felt in the deep perineum and glans penis and frequently radiated to the rectum, bladder and lumbar and hypogastric regions. Some tenesmus is generally present; sometimes this is agonizing and in the effort to force out the residual drop or two the patient may attempt to micturate every ten or fifteen minutes. In severe cases there may be slight hemorrhage after each act. If loss of blood is considerable, it escapes into the bladder and the urine is mixed with it. Nocturnal pollutions

frequently occur in this condition and the discharges may be stained with blood. A serious complication is retention of urine, due to spasm of the compressor urinae; it may call for surgical interference. Incontinence of urine from weakness of the compressor muscle is a troublesome symptom; this is often intermittent, excited by a sudden impulse or the sound of running water. Usually the symptoms are not so severe that the patient is unable to be about, the most annoying symptom being the increased frequency of urination, with the pain and tenesmus which follow it.

Posterior urethritis is often unrecognized. Taylor believes it is present, more or less, in 80 to 90 per cent of the cases of gonorrhea. The increased frequency of urination may not attract great attention and will not be reported to the physician without special inquiry. In other patients the purulent discharge may continue with perineal pain and increased frequency of urination. In such cases there is gonorrhea of the whole length of the urethra.

COMPLICATIONS.—Among the complications are stricture, prostatitis, epididymitis, orchitis, cystitis, nephritis, pyelitis, pyelonephritis, peritonitis and gonorrheal rheumatism.

DIAGNOSIS.—The two-glass test is a valuable diagnostic procedure for differentiating between anterior and posterior urethritis. The patient is directed to urinate in two glass vessels. If the anterior urethra is affected, the urine in the first glass will be cloudy and contain pus, while that in the second will be clear. If the posterior urethra is affected the urine in both glasses will be cloudy. The reason for this is plain. In the first case, the first flow of urine sweeps the secretion to the first glass and that subsequently passed is clear; in the second case, the secretion has passed back into the bladder, so that the first glass contains any pus found in the urethra and the second that which has settled at the base of the bladder.

Still more information may be obtained by primary lavage of the anterior urethra. When this is thoroughly cleansed the urine may be passed into the two glasses. If the quantity of urine in the bladder is small it is probable that distention of the prostatic urethra, making it a part of the bladder, has not yet occurred. The first gush of urine, collected in the first glass,

would therefore clean out this part of the urethra; the contents of the second glass would show the condition of the bladder. In case the prostatic urethra has become distended by urine, there is an admixture of its secretion with the bladder contents; a microscopical examination will then be necessary to determine the source of the epithelial elements.

In all cases of gonorrhea it is wise to make a careful microscopical study of the urethral discharge to determine definitely the presence or absence of the gonococcus.

PROGNOSIS.—The prognosis is good in most cases and under suitable treatment a cure may be expected in four to six weeks. But the extreme tenacity of life of the gonococcus should be remembered as well as the unfortunate complications which sometimes follow the disease. Invasion of the kidneys and genital abscesses are not infrequent occurrences and may produce death; gonorrheal rheumatism resists treatment and epididymitis and orchitis produce impotency. The most lamentable consequence of gonorrhea is the infection of innocent women, producing in them endometritis, salpingitis and other infections, which entail untold suffering and life-long invalidism.

TREATMENT.—*Prophylaxis.*—It is an open question whether the physician should ever give information to prevent the contraction of gonorrhea. There may be cases in which it would be excusable. Thorough cleansing of the genitals of both male and female before and after coitus would doubtless prevent many cases. As a further safeguard a few drops of a 20-per-cent solution of protargol in equal parts of glycerin and water may be instilled into the urethra and a drop or two applied to the glans and inner aspect of the prepuce.

Hygienic and Dietetic.—Although the course of the disease would undoubtedly be shortened and its severity diminished by confining the patient to his bed during the disease this is manifestly impossible in most cases. He should, however, be directed to avoid all unnecessary exercise, to recline as much as possible and to avoid suggestive books, pictures or scenes which might excite sexual activity. The scrotum should be supported in a properly fitting suspensory. The patient should be warned concerning the virulence of the discharge and should practice the most scrupulous cleanliness. Every specialist has a special

device for the collection of the discharge. Hyde and Montgomery use the "gonorrhea" bag containing cotton for absorbing the discharge. This bag is fastened to the suspensory or to a waist band. A square piece of muslin pinned to the undershirt and gathered about the genitals gives further protection. Taylor recommends that a fold of absorbent gauze be perforated so as just to admit the glans penis. The foreskin is then drawn over it, thus providing a gauze drain.

Diet should be bland, consisting quite largely of liquids, as milk, soft eggs, gruels and nourishing broths. Not much lean meat should be eaten and spiced or highly seasoned food, alcoholic drinks and tobacco should be given up entirely. The patient should be encouraged to drink plenty of water. Demulcent drinks, made from flaxseed or slippery elm, are believed to have a sedative effect upon the inflamed mucosa. Their value may be questioned, but a not disagreeable beverage is furnished which will often be taken in larger quantity. Lemonade is an agreeable beverage and helps to alkalinize the urine.

Abortive Treatment.—The effort to abort gonorrhea by strong applications to the urethra is likely to produce more harm than good. It is only excusable at the very inception of the disease, before the congestive stage is fairly established and before pus cells have appeared in the discharge. It is usually carried out as follows: The urethra is first irrigated with a hot boric acid solution. A urethroscope is now introduced to the depth of two to three inches, and an applicator, carrying absorbent cotton, dipped in a strong solution of silver nitrate (15 to 20 grains to the ounce) is introduced through it until it comes in contact with the mucous membrane. The urethroscope, followed by the silver application, is now slowly withdrawn, thereby swabbing the entire anterior urethra. The patient is now directed to lie down, and cold applications are made to the penis. This method often produces violent reaction with a purulent discharge, which in favorable cases subsides in a few days.

Strong antiseptic injections are sometimes used for the purpose of aborting the disease. These are best introduced through a catherer, after cleansing the urethra with boric acid or normal saline solution. Bichlorid of mercury (1 to 1000 to 1 to 2000), potassium permanganate (1 to 1000 to 1 to 2000) and sil-

ver nitrate (1 to 3000 to 1 to 5000) are recommended for this purpose by Taylor. The last named drug is a favorite with Balch (Boston Med. and Surg. Jour.), who uses it as follows: If the lips of the meatus are puffy he uses a strength of 1 grain to the ounce; if there is no evidence of very active inflammation he uses 2 grains to the ounce. This should be held in for about a minute, when it should be allowed to escape and the urethra again washed out with water. Do this twice the first day. Increase the strength of the solution to 2 grains to the ounce the second day, and the next day increase to 3 grains to the ounce. Higher than this it is unwise to go. The discharge becomes thin and watery after a few days and often ceases in five or six. The amount of silver may then be gradually reduced. If at the end of ten days there is no discharge let the patient use an injection of permanganate of potash, 2 grains to 16 ounces of water. He should begin by using it twice a day and continue to use it for two weeks or so. When permanganate of potash is used from the beginning instead of nitrate of silver it is best to irrigate with a large amount of a weak solution rather than with a little of a stronger one.

The Irrigation Method originated by Janet has many warm advocates. It has been greatly popularized in this country by Valentine. It is claimed that it will shorten the course of the disease to a total length of ten days to three weeks, or even abort it if it is employed at the start. A movable reservoir is used, so attached to a standard that its elevation may be altered from time to time as required. This is supplied with rubber tubing, to the distal end of which a suitable nozzle or catheter is attached for insertion into the meatus. When it is desired to irrigate the anterior urethra the reservoir is placed about two feet above the patients' urethral opening; if the posterior urethra and bladder are to be reached it is elevated four and one-half feet or more.

The solutions generally used are bichlorid of mercury and permanganate of potassium; the latter is the favorite. In the beginning it is used in a weak solution, 1 to 6000 to 1 to 4000, and gradually increased to a strength of 1 to 1000. The solution should be as hot as can be comfortably borne (110 to 120 deg. F.); at least a quart should be used each time and it should be given with the patient lying on his side. Two daily irrigations

are given at the beginning of treatment if the patient is seen early and especially if an attempt is to be made to abort the disease. After the first four or five days one daily irrigation is sufficient.

Recent reports show that normal salt solution makes an excellent irrigant in cases of gonorrhea, perhaps fully equal to the permanganate solution. It was tried upon soldiers under very unfavorable conditions but the results were nearly always good, the course of the disease being decidedly shortened in most cases.

On account of the frequency of implication of the posterior urethra, Valentine recommends that this portion be irrigated daily after the fourth day. This is done by raising the irrigator higher (4½ to 6 feet) and "forcing" the vesical sphincter. Where there is difficult or painful, deep inspiration or laughing will sometimes cause relaxation. The anterior urethra should, of course, be cleansed and the patient directed to empty the bladder after it is comfortably filled with the antiseptic solution. The irrigation method of treatment can only be carried out in the physician's office.

The New Silver Salts, protargol, argonin, argentamin, nargol, largin and the new mercury salt mercurol are now much used in the abortive treatment or to cut short the course of gonorrhea. Protargol is the most popular; it has been highly recommended by Neisser. It is claimed that it is a most powerful gonococcocide, but free from the irritant qualities of silver nitrate. A .25 per cent watery solution is used at the beginning, injected with an ordinary blunt pointed hard rubber or glass syringe. The patient is directed to inject a syringeful four times a day, retaining it for five minutes. Neisser directs that the last injection of the day be kept in the urethral canal for thirty minutes; this can seldom be carried out. Nagel suggests that the injections be given every four hours night and day and that they be retained two or three minutes. The strength of the solution is to be gradually increased to one or even two per cent. Garrow (Canadian Jour. Med. and Surg.) and others have used with this a combination of the Janet irrigation method. After each irrigation, protargol (½ to 2 per cent) is introduced into the urethra and retained fifteen to thirty minutes.

Argonin is used in much the same way, but in strength of 2½ to 10 per cent. The other silver salts and mercurol are similar in their action and results.

Acute Stage.—During this stage the main effort of internal medication is to make the urine as bland and unirritating as possible. In addition to dilution by drinking much water it may be alkalinized by use of potassium citrate, acetate, carbonate or liquor potassae.

One of the following prescriptions should be used for this purpose:

Potassium bicarbonate .....oz. 1
Tinct. hyoscyamus .....oz. ½
Water .....oz. 8
Tablespoonful in water one hour after each meal.—Taylor.

Potassium citrate .....oz. ½—1
Spts. lemon .....dr. ½
Simple syrup .....oz. 2
Water .....oz. 1
Dessertspoonful three or four times daily.—Otis.

Buchu, uva ursa, corn silk, pichi, ergot, etc., are recommended on account of the specific effects which they are supposed to produce upon the mucous membrane of the urinary tract. Salol and boric acid (5 to 10 grains of either, three or four times daily) are used to keep the urine aseptic by inhibiting the growth of the gonococcus. The bowels should be kept open by suitable diet where possible, as fresh fruit and the succulent vegetables and by resort to remedies where necessary. An occasional mercurial, compound licorice powder or cascara sagrada will usually serve this purpose. Sometimes a thorough rectal flushing serves best to reduce any local congestion.

Painful urination will be relieved somewhat by immersion of the penis in hot water when emptying the bladder. Taylor finds that plunging the organ into hot boric acid solution several times daily relieves pain and tenderness. Laudanum or fluid extract belladonna may be added to this bath.

Chordee, or painful erection, is one of the most troublesome symptoms of this stage. The patient should sleep in a cool room on a hard mattress, without too much covering, and lie upon the side; he should empty the bladder before retiring and bathe the penis in cold water when erections occur. Potassium bromid,

chloral, lupulin, camphor, belladonna, etc., are used as anaphrodisiacs. Lydston recommends the following mixtures:

Fl. ext. ergot	m. 15
Tinct. gelsemium	m. 5
Potassium bromid	gr. 20
Tinct. hyoscyamus	m. 30
Syrup orange, enough to make	oz. ½

At bedtime.

Or—

Chloral hydrate	gr. 5
Tinct. aconite	m. 3
Sodium bromid	gr. 30
Camphor water	oz. ½

At bedtime.

Taylor recommends the injection, with a medicine dropper, of a few drops of cocain solution before retiring. He uses the following formula:

Magendie's solution	dr. 2
Cocain muriate	gtt. 6—8
Water	oz. 2

A drug which, it is claimed, has a specific effect upon the disease is methylene-blue. O'Neill (Medical Record) claims that by its internal use he can cut short the course of the disease and effect a cure in four to seven days. This remarkable result has, apparently, not been obtained by other physicians. It should not be given alone, since it may produce strangury. This is prevented by a combination with an equal quantity of powdered nutmeg in capsule. The dose is one or two grains three or four times a day, or it may be given in a soft capsule with sandalwood oil, as:

Methylene blue	gr. 1
Oil nutmeg	gtt. 1
Oil sandalwood	gtt. 2

To be taken three times a day.

It should not be continued more than ten days.

The balsamic drugs are, with the exception of sandalwood, contraindicated during the acute stage of the disease. The same may be said of the astringent injections. In fact, with the exception of mild boric acid, borax, lead and opium or similar solutions, many authors disapprove of any attempt at urethral medication before the beginning of the declining stage.

Stationary and declining stages.—When the acuteness of the symptoms has passed, we still have to deal with a profuse purulent discharge. The remedies required here are (1) the balsams, including copaiba, cubebs and sandalwood; (2) astringent injections. Copaiba is most likely to disturb the stomach, but otherwise most useful; sandalwood is less irritant to the stomach; cubeb is most stimulating. Sandalwood may be taken during the increasing stage; the other two only during the declining stage. The sandalwood is best taken in soft capsules. Various combinations of these drugs seem to increase their efficiency. Good formulas are:

Oil sandalwood ..... gr. 5
Balsam copaiba ..... m. 5
Oil cinnamon ..... m. 1

6 to 12 capsules like this are to be taken daily, one hour after meals.—Hare.

Solution potash ..... dr. 1
Balsam copaiba ..... oz. 1
Oil wintergreen ..... m. 10
Fl. ext. licorice ..... oz. ½
Saccharin, a sufficient quantity.
Mucilage, enough to make ..... oz. 4

Teaspoonful every two or three hours.—Lydston

Potassium citrate ..... dr. 2—6
Balsam copaiba ..... dr. 3—6
Fl. ext. hyoscyamus ..... dr. ½—2
Syr. acacia ..... oz. 1½
Peppermint water, enough to make .... oz. 3

Teaspoonful in water.—Keyes.

The addition of the alkali is of decided therapeutic value, since the urine should be kept alkaline throughout the disease. The last prescription may be modified by adding sandalwood or substituting it for the copaiba, the omission of the hyoscyamus if it is not required, etc.

Cubebs, as already indicated, is especially valuable in the later stages of the disease. It may be given in the form of powder in dram doses two or three times daily, or the oleoresin may be suspended in mucilage acacia, in 10 to 20 minim doses and variously combined with other remedies. The following prescription of MacConnell is a somewhat complex combination:

Salol .....dr. 1
Oleoresin cubeb .....dr. 1
Copaiba .....dr. 1
Alum .....dr. 4
Saccharated pepsin .....dr. ½
Oil wintergreen .....gtt. 10
Make 20 capsules. Two every three hours.

Astringent Injections, if used during the increasing stage, should be of the mildest character and used rather for the comfort of the patient, to remove discharges and produce slight sedation (for which purpose opium or morphin may be added), than to produce an astringent effect. During the stationary, and especially at the beginning of the declining stage, the astringents become valuable. The salts of zinc and lead are most used, often with such vegetable astringents as hydrastis, catechu, kino, etc. These are to be used by the patient with a hard rubber "P" syringe with soft rubber tip. He should be directed to urinate first and retain the solution two or three minutes. The number of these combinations is legion, many of them vaunted as "sure cures" by druggists and sympathizing friends. A few illustrative formulas are appended:

Zinc sulphate .....gr. 10
Hydrastin sulphate .....gr. 2
Distilled water .....oz. 4
Injection three or four times daily, last at bedtime.

Zinc sulphate .....gr. 10
Potassium permanganate .....gr. 2
Distilled water .....oz. 4
Injection three or four times daily.

Zinc sulphocarbolate .....gr. 6
Morphin sulphate .....gr. 3
Distilled water .....oz. 3
Inject after urinating.

Mercury bichlorid .....gr. 2—4
Zinc sulpho-carbolate .....gr. 2—10
Boric acid .....dr. 1
Hydrogen peroxid .....oz. 1
Water, enough to make .....oz. 8
Use as injection. —White.

Zinc iodid .....gr. 8
Carbolic acid .....gr. 4
Distilled water .....oz. 4
Injection. —Lydston.

Zinc chlorid .....gr. 2
Zinc iodid .....gr. 4
Distilled water .....oz. 3
Inject after each urination. —Glenn.

Hydrastin muriate .....gr. 10
Fl. ext. hamamelis .....dr. 2
Glycerin .....oz. ½
Water, enough to make .....oz. 4
Injection.

The strength of these injections should be modified according to the severity of the case. At first they should be weak, but gradually increased in strength.

Under this treatment, in favorable cases, the symptoms will rapidly subside until discharge ceases and gonococci can no longer be found. The presence or absence of the coccus determines the completeness of the cure.

Posterior Urethritis.—If during the course of an acute anterior gonorrhea the symptoms of posterior urethritis appear, active local treatment should be at once suspended and rest in bed insisted upon unless the symptoms are very mild. The hygienic treatment already directed should be continued and saline cathartics administered to secure one or more daily evacuations. The pain may be relieved by hot hip baths, and in severe cases the urine should be passed while this portion of the body is immersed. Leeches may be applied to the perineum if tenesmus is extreme. A hot-water bag over the bladder and the rectal injection of very hot water will often give marked relief. Mild alkaline and anodyne mixtures should be taken internally. Taylor prescribes:

Fl. ext. triticum repens.....oz. 1½
Fl. ext. uva ursa, ...oz. 1½
Liquor potassa .....oz. ½
Tinct. opium .....gtt. 64—96
Water, enough to make .....oz. 4
Teaspoonful in water every three or four hours.

Hayden recommends:

Potassium bicarbonate .....oz. 1
Tinct. hyoscyamus .....oz. ½
Fl. ext. kava kava .....oz. ½
Water, enough to make .....oz. 8
Tablespoonful in water two hours after each meal and at bedtime.

Alkaline mixtures must, however, be given with caution, since marked alkalinity of the urine would favor ammoniacal decomposition. Copaiba and sandalwood are often of benefit, but during the acute stages must often be suspended until the severity is somewhat abated. Their use may then be resumed. To keep the urine sterile salol, or boric acid, 5 to 10 grains every three hours, may be administered.

For the relief of pain and tenesmus, and to secure sleep, hypodermics of morphin or suppositories should be given, as:

Morphin sulphate .....gr. $\frac{1}{4}$—$\frac{1}{2}$
Ext. belladonna .....gr. $\frac{1}{2}$—1
Cacao butter, a sufficient quantity.

A combination like the following may be found useful for internal use:

Salol .....gr. 5
Dover's powder .....gr. 5
To be taken every three hours.

Local treatment is indicated after the acuteness of the symptoms has subsided. At first hot solutions of boric acid may be used, then more astringent drugs, such as protargol, potassium permanganate, alum and zinc salts, later silver nitrate.

The posterior urethra may be reached by the method of Janet; first washing out the anterior urethra. It is better in very severe cases to apply the medicament directly to the inflamed spot by means of the Ultzmann catheter. The solution most employed is nitrate of silver, $\frac{1}{4}$ to 1 grain to the ounce.

CHRONIC GONORRHEA; GLEET.

Symptoms.—An acute attack of gonorrhea often leaves behind a localized patch of inflammation. This may be caused by too early abandonment of treatment, by unskillful treatment or by alcoholic or sexual excesses before the inflammation has entirely subsided. These inflamed, granulating or ulcerating patches may be confined to the anterior urethra or found only in the posterior urethra, or both. In the first case the symptom of which the patient usually complains is the persistence of the discharge. This is usually absent during the day and is noticed in the morning as a drop or two of mucus or muco-pus, which may be almost colorless and only abundant enough to moisten

the glans and prepuce and stick together the lips of the meatus; or the discharge may be absent, except when lighted up from time to time by the use of tobacco, alcohol or sexual indulgence. Sometimes in connection with this there are painful or tender points along the course of the urethra or a sense of tingling or burning upon urination.

In chronic posterior urethritis there is usually no discharge from the urethra, though this may very rarely be the case. Examination of the urine will show some epithelial shreds and pus. Otherwise there may be no symptoms unless the disease is lighted up into an acute or subacute state. Usually, however, there is some increase in the frequency of urination and some uneasiness, perhaps amounting to pain, at the close of the act. This pain varies greatly. At times it is entirely absent; again, there is dull burning pain in the urethra; in other cases it may be spasmodic or neuralgic-like. It often radiates to the groins, rectum or testes. "Cystospasm" may occur, shutting off temporarily the flow of urine. In some of the more severe cases there is interference with the sexual function, with nocturnal emissions, premature ejaculation, imperfect erection and loss of sexual desire.

DIAGNOSIS.—The two glass test or the method of lavage described under Acute Urethritis, furnishes information as to the location of the lesion. Further information is obtained by the use of the endoscope. This instrument makes it possible to exactly locate and fix the character of the morbid process if it is situated in the anterior urethra. Most common are reddened, thickened pus-discharging patches. Granulating masses may sometimes be seen, and ulcerations, erosions and the mouths of inflamed follicles or crypts. The passage of the bougie-a-boule or a sound locates strictures and inflamed areas. Strictures are probably present in half the cases.

TREATMENT.—If the patient has been receiving irritant injections in the urethra an interval of rest should be allowed the mucous membrane before active treatment is commenced. By following the ordinary methods of diagnosis, but avoiding at the start the use of sounds or other instruments, the extent and location of the morbid process is determined. If this is found to involve a considerable portion of the urethra, treatment similar to that pursued in the declining stage of the acute attack is

followed, copaiba and sandalwood being given internally and the urethra being irrigated with warm solutions of zinc sulphate or alum, commencing with a strength of one grain to the ounce, then gradually increased. If this fails, potassium permanganate, commencing with a solution of 1 to 6000, which is increased to a strength of 1 to 1000 may be tried. Silver nitrate is, however, the most valuable drug. For irrigation it must be weak (1 to 10,000 increased to 1 to 1,000). These irrigations may be made with the fountain syringe or the Janet apparatus. If the bulb is affected the return flow catheter may be used to insure reaching the affected area. Protargol is of undoubted value in some of these cases. A one-half to one per cent solution may be injected after irrigation, in the manner described for acute gonorrhea.

Injections made with the ordinary hand syringe are also used in chronic gonorrhea. They resemble those used in the acute stage, but are usually stronger. The following is highly recommended:

Mercuric chlorid	gr.	$\frac{1}{8}$
Zinc sulphocarbolate	dr.	$\frac{1}{2}$
Boric acid	dr.	2
Carbolic acid	gr.	15
Boroglycerid (25 per cent)	oz.	2
Water	oz.	6

Injection. Dilute if painful.

Many of these cases are due to stricture of the anterior urethra. If the disease is unquestionably confined to this part, the passage of sounds of large size will give prompt relief. The indiscriminate use of sounds in chronic gonorrhea is, however, to be deplored, since they may do irreparable injury. In obstinate cases of gonorrhea Unna coats his sounds with the following mixture, which melts at body temperature and is left in contact with the urethra:

Cocoanut oil	oz.	3
White wax	dr.	$\frac{1}{2}$
Silver nitrate	gr.	15
Balsam Peru	dr.	$\frac{1}{2}$

In cases of chronic anterior urethritis, in which the process is shown by the endoscope or the bougie-a-boule to be distinctly localized, the best results are obtained by local applications of a solution of silver nitrate, beginning with 1 to 2,000 and increas-

ing to 1 to 250 if necessary. These are made with a hand syringe, drop by drop, through a soft rubber catherer. Inflamed follicular openings, granulating masses and ulcers are treated through the endoscope by touching with strong solutions of silver nitrate (10 to 30 grains to the ounce).

In *chronic posterior urethritis* the irrigants just described may be used through a catheter or with the Janet apparatus, after washing out the anterior urethra; and internally the balsamic remedies, salol, boric acid and such drugs as pichi, uva ursa, buchu, etc., are given. The alkaline diuretics are administered if the urine is acid; if it is alkaline, ammonium benzoate is prescribed, as in the following:

Ammonium benzoate	dr. 3
Fl. ext. cubebs	dr. 3
Tinct. eucalyptus	dr. 2
Fl. ext. licorice	oz. 1
Water, enough to make	oz. 6

Tablespoonful after meals.

A drug which has recently been used in chronic posterior urethritis with good results is urotropin. Dalton (Therapist) reports a large number of cases treated with it. The dose is 5 to 10 grains two or three times daily.

But the remedies which do the most good are those which are applied directly to the damaged urethral area. These applications may be made with an Ultzmann syringe or through a soft catheter. Silver nitrate is principally used. In a strength of 2 to 4 grains to the ounce a few drops may be deposited in the posterior urethra. Protargol (1 to 5 grains to the ounce) may also be used. Finger uses the silver salt in the form of an ointment:

Silver nitrate	gr. 15
Olive oil	dr. 1½
Lanolin	oz. 3

This is introduced through an ordinary catheter to the damaged area in the posterior urethra.

In some of these cases, where there is considerable hyperesthesia the use of the cold sound, introduced once or twice a week, produces decidedly beneficial results. It should be discontinued if no improvement is observed soon. Electrolytic currents sometimes benefit these cases.

Hot rectal irrigations, good food, suitable exercise, mental employment and tonic medication are useful adjuvants to the treatment.

GONORRHEA IN WOMEN—*See Vaginitis and Vulvitis.*

GOUT; LITHEMIA; URICEMIA.

DEFINITION.—Gout or goutiness is a nutritional disease caused by an accumulation of uric acid in the blood; this is precipitated in the joints and other tissues as sodium biurate, producing arthritic pain and deformity, and various constitutional symptoms.

VARIETIES.—According to the character of the symptoms we may describe two forms of this disease: (1) Gout, which may be (a) acute, (b) chronic, or (c) irregular; (2) Lithemia (uricemia, goutiness, or latent gout).

ETIOLOGY.—Gout is often hereditary, is much more common in men than in women and seldom occurs before the thirtieth year. Acute attacks are more likely to occur during cool weather and especially in the fall and spring. The exciting causes are overindulgence in foods rich in proteid and in substances likely to engender acid fermentation, and in certain alcoholic drinks, especially the heavy sweet wines, as port, madeira and sherry and malt drinks like porter and ale. On account of luxurious habits and insufficient exercise metabolism is imperfect, excretion is defective and the body is unable to dispose of the nitrogenous waste. Typical gout is uncommon in the United States. According to Luff, in every case of gout there is disease of the kidneys and the uric acid (or rather the sodium quadriurate, since that is the form in which it exists in the blood) is formed from urea and glyconin. Certain poisons, notably lead, may produce the disease.

Much difference of opinion exists as to the pathogenesis of gout. There is practical agreement upon this; that the disease is caused by an accumulation of uric acid, in the form of sodium quadriurate, in the blood. Increased alkalinity (according to most authorities) causes its precipitation as the insoluble sodium biurate in the joints. As to the origin of the uric acid, Haig explains it by an increased production, due to an excess of pro-

teid food and substances rich in similar chemical bodies, as xanthin, etc., Luff, as already said, makes its presence dependent upon defective kidneys. A later theory, which commands careful consideration, is that the uric acid is formed from broken down leukocytes. Corroborative of this is the fact that the uric acid diseases often attend leukocytosis. For instance the relation of the joint disturbances, gout and rheumatism, and of neuralgia to colds and influenza, which are attended with leukocytosis, is well known. This theory would also explain the occurrence of gonorrheal rheumatism following the cessation of the discharge. According to Ebstein, the deposit of sodium biurate is due to a preformed necrosis of the tissues caused by saturation of the circulating fluid with uric acid. Cullen many years ago proposed the neuro-trophic theory. This is well stated by Duckworth, its principal supporter, as follows: "A paroxysm of gout, the sites of its occurrence, and its metastases, are determined by nervous influences, probably dominated from the bulbar center, and the local attacks alight either in the joints, or in textures which have been weakened or rendered vulnerable by impaired nutrition, owing to past injury or over-use."

The enthusiastic studies of Haig seem to show that uricemia is responsible for a series of symptoms far more extensive than commonly credited to it. He divides these into two classes. The first is due to the precipitation of the uric acid when the alkalinity of the blood is lowered; this includes notably gout and rheumatism. The second is due to a rapid passage of the uric acid through the blood, causing contraction of the arterioles, high blood pressure and slow pulse. Among the diseases ascribed to this are migraine, asthma, hay-fever, eczematous attacks, epilepsy, etc. This form is described by Ewert as "goutiness." In this country it is known as *lithemia*, uricemia and latent gout, differing only from the irregular gout described by English writers in the fact that true arthritic symptoms do not occur.

PATHOLOGY.—The pathology of gout consists mainly in the joint changes, due to the sodium urate deposits. These form well marked concretions or "tophi," which may reach large size and cause severe inflammation of the adjacent tissues. Secondary changes of the cartilaginous and fibrous structures may produce permanent and marked deformity. Sometimes ulceration results

and the tophi are discharged through the skin. The joints, especially that of the great toe, suffer most, but concretions have been found in many other tissues. Lithemia presents no characteristic morbid changes.

PROGNOSIS.—The prognosis is generally good as regards the disease itself, but the frequent implication of the kidneys and the tendency to arterio-sclerosis often results in complicating disorders of the gravest character.

GOUT.

SYMPTOMS OF GOUT.—*Acute Gout.*—The disease usually commences with an acute attack. This is preceded by prodromes, as irritability of temper, despondency and insomnia,—sometimes by dyspeptic symptoms, asthmatic attacks, pains in the joints and muscular cramps. These may entirely disappear before the commencement of the attack. The latter usually occurs in the early morning hours. There is severe pain in the great toe, which becomes swollen, inflamed, red and shiny and excessively tender upon pressure. There is an associated rise of temperature (102°-103° F.) and an irritable temper. During the following day the symptoms subside, leaving the toe sensitive but so it may be used. The next morning the attack recurs and this may be repeated for several days, gradually decreasing in severity. During and preceding the paroxysm Garrod asserted that there was decreased excretion of uric acid. This statement has long been accepted, but recent investigations of Klemperer, Magnus-Levy and others do not substantiate it. Attacks of gout may occur at first only at long intervals, as a year, but are likely to increase in frequency.

Retrocedent gout is a form in which the joint symptoms disappear and severe visceral symptoms take their place. Gastric, cardiac or cerebral involvement may occur and produce profound depression and sometimes result in death.

Chronic gout is a frequent sequence of acute gout, the intervals between attacks becoming shorter and the attacks themselves less acute but the inflammation more continuous. The "tophi" enlarge in size, the disease spreads to other joints, first the toes, then the fingers and later the ankles and wrists, causing increasing enlargement and deformity. Sometimes chalk-like deposits

are formed along the tendons, in the helix of the ear and in other localities.

Among the associated conditions are gastro-intestinal catarrh, cardiac hypertrophy with high arterial tension, arterio-sclerosis, and contracted kidney. The last is a natural consequence of this condition. The urine is at first scanty, high colored and loaded with brick-dust sediment, but with the development of interstitial nephritis it becomes abundant, pale and of low specific gravity.

Persons suffering with chronic gout are prone to exhibit a good deal of nervous irritability, insomnia, etc., but in spite of this retain excellent mental power.

Irregular gout ("goutiness") is, according to Duckworth, "gout manifesting itself anywhere but in a joint." In its symptomatology it is practically identical with lithemia except in this,—that it occurs in persons of gouty heredity and is likely to merge into true gout. In lithemia the joints are unaffected and there are no tophi.

Among the symptoms are increased blood pressure due to the uric acid in the blood exciting arteriosclerosis, which may be followed by diseases dependent upon it, as interstitial nephritis. The urine is usually scanty and high colored and often contains gravel. The uric acid in the blood seems to have a peculiarly irritant action upon the mucous membranes and these patients are susceptible to attacks of coryza, conjunctivitis, pharyngitis and laryngitis, while cystitis and urethritis are not uncommon. Dyspeptic attacks, gastralgia and diarrhea may occur.

Some respiratory expressions of this condition are bronchitis, emphysema and asthma. Upon the skin there may be eczematous eruptions, erythema or urticaria.

Neuralgias and migraine, burning and itching of the eyeballs and of the palms of the hands and soles of the feet are common nervous symptoms. Mental irritability, insomnia and despondency are the usual psychical disturbances. A peculiar feature of these cases is that these different symptoms often alternate, for instance, an eczema may suddenly disappear only to be replaced by an asthmatic attack.

Diagnosis.—In typical gout there is no difficulty of diagnosis. The heredity, the history of previous attacks and the presence of tophi are usually characteristic.

If several joints are affected the disease may sometimes be mistaken for *rheumatism*. Thompson calls attention to the fact that in gout the greatest tenderness is over the condyles, laterally; in rheumatism, it is over the extensor and flexor tendons, anteriorly and posteriorly. Gout usually attacks the small joints; rheumatism the large ones.

Arthritis deformans gives no history of heredity, affects females more than males, commences in the fingers and deformity is due to bony exostoses with ankylosis,—not to tophi.

TREATMENT—*Dietetic and Hygienic.*—Gouty patients are usually high livers, who partake freely of rich proteid and starchy foods, drink much wine and malt liquor but little water, and take little exercise. There develops, therefore, a disturbance of equilibrium between nutrition and excretion. The effort of treatment is to restore this equilibrium. *The first requisite is abstemiousness.* The patient should be instructed to eat only what is necessary for proper nutrition and make his meals as simple as possible. According to Luff, "it is especially desirable to avoid at any one meal much mixing of proteids and carbohydrates. The stomach of a gouty patient, unlike that of a healthy individual, is not well able to digest half a dozen different kinds of food at the same time." The meals should be taken regularly and the dietary selected with care. It should consist, in the average case, principally of the following articles: Milk and butter freely, eggs in moderation, stale bread and toast, the farinaceous foods with the exception of oatmeal, fresh and cooked but unsweetened fruits (except strawberries, cherries, oranges, lemons, and other acid fruits) and the fresh succulent vegetables, as cabbage, spinach, celery, onions, baked potatoes, etc. These vegetables, according to Luff, "possess the double function of inhibiting the change of sodium quadriurate into the biurate and increasing the solubility of the latter." Meats are to be used in moderation. Fish, oysters, the white meat of chicken and fats are to be preferred. Red meats, as beef, veal, mutton, etc., should not be eaten more than once daily, then very sparingly; in severe cases they must be excluded. In adjusting the diet the nutritional status of the patient must be kept in mind. For instance, obese patients may profitably be given a larger percentage of meats and a smaller one of starches and fats, while

in thin ones the exact reverse would be indicated. Furthermore, debility requires a generous, nutritious diet, while plethora demands a restricted one.

Of beverages, pure water is the best. The patient should be directed to drink this in large quantities. It flushes the kidneys and lowers the specific gravity of the urine. Milk diluted with Vichy makes an agreeable drink where more nutrition is desired. The alkaline mineral waters, as Vichy, Vals, Kissingen, Buffalo Lithia, etc., all do excellent service in this disease. If there is constipation with plethora the purgative waters, as Hunyadi, Friedrichshall and Apenta are indicated. A course of mineral waters at a good spa, with the associated dietetic and hygienic regime, gives excellent results in many cases.

Foods contraindicated are the red meats (except as specifically allowed), cheese, hot bread, puddings, pies, cakes, rich sauces and gravies, made dishes, acid fruits or vegetables and condiments. Beverages forbidden are tea and coffee, heavy sweet wines, as port, sherry, madeira and champagne, and malt liquors, as beer, ale and porter. All alcoholic drinks are best left alone, but the least objectionable are whiskey, gin and claret or other light sour wines.

Outdoor exercise should be encouraged and, when possible, the physician should prescribe massage, the morning cold bath, an occasional Turkish bath, if the patient is robust, sulphur baths and other hydrotherapeutic measures which help to raise the body tone and promote elimination.

Medicinal treatment should be commenced with a brisk laxative for which purpose a mild mercurial (calomel or blue pill) followed by an aperient, as magnesium sulphate, Hunyadi or Apenta water is best. The drug of most value in the acute attacks of gout is colchicum. The wine or tincture is given in 20 to 30-drop doses every four hours until the pain is relieved, then in 10 to 15-drop doses three times daily for several days following. Some advise giving it in increasing doses until slight diarrhea is produced, others in a large initial dose (30 to 60 minims), followed by smaller doses. It is frequently combined with alkalies, diuretics and laxatives. An old mixture, but one still much used, is the following, which was prescribed by Scudamore:

Magnesium sulphate.....dr. 4
Magnesia .....gr. 80
Vinegar colchicum.....dr. 4
Syrup crocus.....dr. 4
Peppermint water, enough to make.....oz. 4

One to three tablespoonfuls every hour until four to six bowel movements are secured within twenty-four hours.

Similar to this is the following, by Fothergill:

Magnesium sulphate.....dr. 2
Potassium carbonate.....gr. 15
Tinct. colchicum.....m. 10
Infus. buchu.....oz. 1

This quantity to be taken every four to six hours, followed by a large draft of water, not too cold.

Colchicin is also used in this disease, the dose being $^1/_{50}$ to $^1/_{25}$ grain; also salicylate of colchicin in 5 minim doses, given in capsules. They have no advantages over the wine or tincture of colchicum.

Sodium salicylate has been much praised for gout. It should be given in full doses (10 to 20 grains every two to four hours). Some, as Tyson, consider this drug superior to colchicum and place it at the head of the list. When for any reason colchicum cannot be given or when it fails to bring relief the salicylate should be tried. Salicylate of lithium is preferred by some clinicians.

Colocynth is also recommended in gout, both in connection with colchicum as a laxative and alone.

Piperazin (15 grains three times a day in water) has been highly recommended as a uric acid solvent and diuretic, but in clinical use it has proven somewhat disappointing. Lysidin is a similar drug.

To further encourage diuresis and reduce the acidity of the urine, thereby promoting the elimination of the quadriurates and biurates from the system, in addition to the use of large quantities of water the alkaline salts are to be given. Lithium citrate and carbonate are much used, in 5 to 10-grain doses three or four times daily, but have not proved as satisfactory as was expected. The potassium salts are generally preferred; the citrate, acetate, or bicarbonate are given in 15-grain doses every three or four hours. According to Luff these salts are

indicated while the sodium salts are distinctly contraindicated, since they hasten the conversion of the quadriurate into the crystalline insoluble sodium biurate. The potassium salts may be profitably combined with colchicum during the attack and also given in the interval.

Local applications are useful for the relief of pain. Gauze or flannel compresses wrung out of hot water alkalinized with sodium bicarbonate and containing laudanum may be applied. Other suggested applications are mixtures of tincture belladonna and glycerin (1 dram to the ounce) and ichthyol and lanolin (1 dram to the ounce).

If pain is very severe it may be necessary to resort to hypodermics of morphin.

In *chronic gout* the treatment is essentially the same as that already outlined for the treatment of the interval between acute attacks, that is, it is chiefly hygienic and dietetic. The colchicum is valuable in proportion to the activity of the symptoms. It is usually combined with potassium iodid, as in the following:

Wine colchicum	oz. ½
Potassium iodid	dr. 2
Solution potash	oz. 1½
Tinct. ginger	oz. 2

Teaspoonful twice daily in warm water.—Hodgscn.

As laxatives, an occasional mercurial is valuable, such as calomel or blue pill; the daily use of the saline aperients is often beneficial. The potassium and lithium salts are extremely useful, but water is the best diuretic.

The best local treatment, as given by Luff, is as follows: "Enlarged joints and other gouty deposits should be treated with a view to the removal of the deposited sodium biurate. This can be accomplished in various ways. Massage and muscular movements increase the flow of lymph in the lymph channels, and thus tend to promote the removal of uratic deposits, and to increase the metabolism of the joints. With this treatment passage of the constant current through, and the application of cataphoresis to, the affected joints and tissues may be combined advantageously. Baths of various kinds, including superheated air and radiant-heat baths, are valuable. Suitable treatment at a properly selected spa is also of great benefit."

LITHEMIA; URICEMIA.

SYMPTOMS OF LITHEMIA.—As already stated these are practically identical with those of irregular gout *minus* the arthritic symptoms, and the heredity. These patients, as in typical gout, eat too much rich food, drink too freely of sweet wines or malt liquors, drink too little water and take insufficient exercise. Often they are neurotic. The symptoms are generally referred principally to the digestive and nervous systems, being often popularly described as "biliousness," in case the digestive organs are principally affected. In such cases the appetite is capricious; the tongue is usually coated, though it may be red and dry; there is an unpleasant taste in the mouth, a sense of fulness and distention of the stomach after eating, and flatulence an hour or two after meals, if there is amylaceous dyspepsia. Gastric acidity and pyrosis are common and sometimes there is nausea or vomiting. Constipation is the rule, though there may be occasional attacks of diarrhea with the passage of frothy, ill-smelling stools. There are often hemorrhoids.

The nervous symptoms include irritability of temper, vertigo, disturbances of sensation, including tingling, burning and numbness of the skin. The pulse is usually slow and arterial tension is high, but there are often attacks of cardiac palpitation, especially in association with the flatulence following meals. This slow pulse of high tension is due, according to Haig, to the irritant action of the uric acid in the blood, exciting contraction in the arterioles. The obstructed circulation excites attacks of asthma, migraine, bronchitis, eczema, urticaria, pruritus and other respiratory and cutaneous diseases, to which these patients are especially susceptible. The tendency to irritation of the mucous membranes has already been referred to under Irregular Gout, as expressed in coryza, laryngitis, cystitis, urethritis, etc.

The urine is generally scanty, acid, high colored, of high specific gravity (1025 to 1035) and deposits on cooling a brick-dust sediment. Arteriosclerosis usually develops if the condition continues and interstitial nephritis may result.

TREATMENT.—This is essentially dietetic and hygienic along the lines already described in the treatment of gout. The diet

may be epitomized as follows: Prohibition or restriction of meats, sweets, hot breads, pastries, puddings, sauces, condiments and made dishes, and of wine, beer, tea and coffee. Recommend a diet in which milk, butter, cereals, fresh vegetables and fruits (not acid) are prominent. Remember, however, that the kind and quality of food must be regulated to meet the nutrutional demands and the digestive powers of the patient. Some patients do best when meats are prohibited; others require a diminution of the quantity of carbohydrates. Large quantities of pure water should be drunk. The alkaline, natural mineral waters, as Vichy or Vals, are particularly beneficial. Every effort should be made to stimulate metabolism by outdoor air and exercise, as walking, riding, bicycling, golf, etc., or by proper gymnastic exercises or massage. Cool sponge or shower baths are decidedly tonic and aid excretion, and an occasional Turkish bath is a powerful eliminant.

Medicinally the alkaline diuretics and the saline laxatives are most valuable. The former, by raising the alkalinity of the blood, promotes the excretion of uric acid. Potassium citrate, acetate, or bicarbonate (10 to 30 grains) or lithium carbonate or citrate (5 to 10 grains) may be taken several times daily well diluted with a large amount of water. As laxatives Carlsbad, Hunyadi, Freidrichshalle and Apenta are extremely useful. Sodium phosphate is a favorite aperient and is said to have a peculiar solvent power for uric acid. A dram may be taken every morning in hot water. Some cases do better upon an occasional mercurial (calomel or blue mass), or cascara sagrada, podophyllin or rhubarb.

Sodium salicylate is considered by Haig of specific value in causing the rapid elimination of uric acid. It certainly seems to be decidedly useful in many of these cases.

Digestive troubles should be treated according to the indications. If there is hypoacidity, hydrochloric acid, pepsin and the bitter tonics, as strychnin or nux vomica, are indicated as aids to proteid digestion. In neurasthenics strychnin and arsenic will be found useful; patients of this class sometimes require nerve sedatives, such as sodium bromid.

GRAVEL—See Nephrolithiasis.

HAIR, FALLING OF—See Alopecia.

HAY FEVER; HAY ASTHMA; ROSE COLD.

DEFINITION.—An acute catarrhal inflammation of the upper air passages occurring generally in the autumn or spring and characterized by coryza and asthmatic attacks.

ETIOLOGY.—Just what conditions are necessary to produce an attack of hay-fever are not yet clearly understood. Probably in most cases the predisposing cause is some peculiar vice of constitution. The disease is often hereditary and it is noticed that these patients are often neuropathic, anemic and poorly nourished. Müller of Vienna believes that there is a close relationship between the disease and gastro-intestinal disturbances. The uric acid theory has been invoked by the disciples of Haig (notably S. S. Bishop, of Chicago) to explain the etiology of the disease. (See article on Gout). Indigestion, intestinal toxemia, disturbed nutrition and defective excretion are also cited as causes. As causes of reflex irritation, hypertrophic rhinitis, deflection of the septum, nasal spurs or other abnormalities are recognized as factors.

The exciting cause is believed to be the inhalation of an irritant to the nasal mucous membrane, usually the pollen of plants. Among those which may cause it are the rose, lily-of-the-valley, golden rod, various grains and grasses and the ragweed. The last named is found in all parts of the country and is probably responsible for most of the cases.

SYMPTOMS.—In England and the continent the initial attack of hay fever usually commences in May or June. In this country it generally begins between the tenth of August and the first of September. The onset of the disease recurs with remarkable regularity, often upon the same day of the month each year.

There may be prodromes, preceding the attack by a few days, such as malaise, depression of spirits, loss of appetite, chilliness and dull headache. Sometimes cutaneous eruptions precede the catarrhal symptoms. But usually the disease appears suddenly with a sense of fullness in the nasal and frontal regions, fol-

lowed by spasmodic, persistent sneezing, an acute rhinitis with profuse serous discharge from the nose, congestion and redness of the conjunctivae, with free lacrimation and smarting, burning pain in the eyes, photophobia, swelling of the lids and puffiness of the face. The trouble spreads to the naso-pharynx and sometimes to the larynx and bronchi, setting up an obstinate cough. Swallowing becomes difficult, there is often a sense of impending suffocation and there are nervous irritability, depression of spirits and insomnia. A late symptom is asthma, not differing from ordinary asthma, and more often associated with bronchial than nasal symptoms. An attack of hay fever usually lasts four to six weeks, but terminates at the first frost.

PROGNOSIS.—The disease never causes death, but once acquired is likely to persist year after year unless the patient removes to an unaffected locality during the hay fever season, or finds cure by appropriate treatment.

TREATMENT.—In treating patients susceptible to hay fever an attempt should be made to locate the cause of the disease; this should be vigorously attacked. A careful examination should be made of the nasal and pharyngeal cavities and any disease or abnormality corrected. Spurs, polypi or enlarged tonsils should be removed or a deflected septum straightened. If there is chronic hypertrophic rhinitis it demands especial care. If there is gastro-intestinal disturbance, intestinal indigestion or constipation the digestive tract should be thoroughly cleaned out daily with alkaline mineral waters and appropriate dietetic, hygienic and medicinal measures instituted to secure gastric and intestinal activity. Neurasthenics require change of occupation, rest, exercise, massage, hydrotherapy and tonic treatment, with iron, quinin, strychnin and arsenic. Dr. Clara H. Bruce (Cincinnati Lancet-Clinic) found, in her own case, that tonic treatment prevented a recurrence of the attacks. For this purpose she took the following tablet:

Strychnin sulphate	gr. $^1/_{50}$
Quinin sulphate	gr. $\frac{1}{2}$
Arsenous acid	gr. $^1/_{50}$
Reduced iron	gr. $^2/_5$
Gentian	gr. 1

One tablet after each meal for a month, then two after each

meal for many months or until the underlying condition is cured.

The elixir of iron, quinin and strychnin, or similar preparations may be taken for the same purpose. Arsenic is one of the most valuable drugs, as in:

Sol. potassium arsenite .....dr. 1
Tinct. nux vomica .....dr. 2
Comp. tinct. gentian, enough to make.....oz. 3
Teaspoonful in water after each meal.—Ingals.

Or an alterative may be added, as in the following prescription of Sajous:

Sol. potassium arsenite .....dr. ½
Potassium iodid .....dr. 3
Wine of pepsin, enough to make.....oz. 8
Tablespoonful in water three times a day.

The uric acid theory has been invoked by the disciples of Haig to explain the etiology of the disease. This being allowed, a dietary which minimizes the amount of food containing or producing uric acid or similar bodies and excludes articles which cause intestinal acidity or in any way lower the alkalinity of the blood, should prove of value. Lean meats should be reduced to a minimum or forbidden, and tea, coffee, alcohol, sweets and rich or highly seasoned foods given up entirely, or at least for some weeks preceding the expected attack. Bishop recommends 10 to 15 grains of lithia in effervescent tablets before every meat meal. Drugs that alkalinize the blood, as potassium citrate or acetate (10 to 30 grains every three to four hours), or lithium citrate or carbonate (15 to 25 grains daily in effervescing tablets) and lower arterial tension, such as sodium salicylate, are indicated. Bishop gives the salicylates in full doses (10 to 15 grains every two to four hours) and alkalies before the appearance of the attack in order to eliminate the uric acid. During the attack he gives concentrated nitro-muriatic acid, in 3 to 5 drop doses in half a glass of water after each meal. The acid treatment is for temporary relief only. To promote action of the skin, hot or Turkish baths are useful.

In view of the fact that the specific cause of the disease is the pollen of a plant, Curtis (Medical News) has recently found it practicable to administer the tincture or fluid-extract of the causative plant, in order to produce an immunizing effect. His

results are very favorable to this treatment, so far as reported. He gives the drug internally or hypodermically, commencing, if possible, two weeks before the expected attack. Given during the attack, the symptoms are decidedly modified. He gives of the fluid-extract of rag-weed 2 to 10 drops three times a day.

To modify the local effect belladonna or its alkaloid, atropin, is a popular drug. Anders recommends $^1/_{300}$ grain of atropin given every hour until dryness of the throat appears or, hypodermically, $^1/_{200}$ grain every three hours until the desired effect is produced. Quinin has long been a popular remedy, 10 to 15 grains being given daily. Digitalis may also be used if there is circulatory disturbance. The following prescription is from Gould's Cyclopedia:

Ext. belladonna	gr. 1
Ext. cannabis indica	gr. 1
Camphor	gr. 15
Quinin	gr. 20

Divide into 6 capsules; one every three hours.

Morphin undoubtedly gives relief, but is a dangerous drug for habitual use and must be used with caution. Heroin and codein are less dangerous and are sometimes satisfactory. Wetherby (Medical Council) recommends:

Heroin	gr. 1
Atropin sulphate	gr. $^1/_{25}$
Caffein citrate	gr. 15
Salophen	gr. 75

Divide into 15 capsules; one capsule four times a day.

Another drug which is recommended for both external and internal use, and apparently gives remarkable results, is the suprarenal extract. This is taken internally in doses of one to five grains every two hours, until there are symptoms of cardiac palpitation or the desired local effect is produced.

Most dependence is usually placed upon the *local treatment.* Hollopeter, who claims to have treated more than 200 cases without failing to give relief, proceeds as follows: He first uses the following detergent spray in both nostrils:

Sodium bicarbonate	oz. 1½
Sodium borate	oz. 1½
Carbolic acid	oz. 1
Glycerin	oz. 2
Rose-water, enough to make	pt. 1

Or, in cases where there is an idiosyncrasy to carbolic acid, he uses:

Hydrogen dioxid	oz. 2
Glycerin	oz. 2
Distilled water	oz. 2

The foam produced by this application is removed by irrigation with plain sterile water.

After making one of these cleansing applications he scrubs carefully with a cotton swab every portion of the mucous membrane. It is then dried and an oily preparation used, as follows:

Menthol	gr. 10
Oil eucalyptus	dr. 1
Camphor	dr. ½
Albolene	oz. 2

In severe cases he uses cocain or eucain, as in the following:

Menthol	gr. 8
Boric acid	gr. 30
Albolene	oz. 2
Sol eucain, B, (4 per cent)	oz. 2

Beaman Douglass commences treatment with a preliminary 1-per-cent watery spray to the nostril, after which he douches the part with hot (106° to 114° F.) saline solution, which is allowed to run from a bag placed six inches above the head. If the head is well bent over and all breathing is done by the mouth, the solution will run into one nostril and out of the other. After this douching and complete drying, 4 to 6 per cent cocain solution is applied. To prolong the effect he follows with a slight cauterizant, as:

Mercury bichlorid	gr. 1
Quinin hydrochlorid	dr. 1
Glycerole carb. acid (B. P.)	oz. 1

Apply on pledgets of cotton or by a spray.

The most popular local application in hay fever is a solution of cocain, best applied to the mucous membrane with a cotton swab. This is usually used in a strength of 1 to 2 per cent. Gleason claims that its effect may be prolonged by following it with a 4-per-cent solution of antipyrin. Another drug of great value for local use is menthol. A good formula is:

Menthol .....gr. 1/18
Eucalyptol .....gr. 1/8
Cocain hydrochlorate .....gr. 1/140
Benzoic acid .....gr. 1/12
Oil of anise .....m. 1/40
Distilled water .....oz. 2

Use as a spray several times a day.—Bruce.

Quinin has also been used as a local application. It is sometimes combined with the cocain and menthol sprays. Sometimes an ointment or "catarrh balm" will give relief. The following prescription is a good menthol preparation for home use:

Cocain hydrochlorate .....gr. 6
Carbolic acid .....gr. 10
Menthol .....gr. 20
Oil of sweet almond.....dr. 2
Zinc ointment .....oz. ½

To be applied to the nostril on a cotton pledget.—Standard Formulary.

Douglass gives his patients the following, to be used at home after the douche:

Cocain (alkaloid) .....gr. 2½
Zinc oxid .....dr. 1
Bismuth subnitrate .....dr. ½
Albolene (liquid) .....oz. 1

Shake and use with a medicine dropper every two hours.

After the very acute symptoms have subsided we may substitute an oily spray as a protective to the mucous membrane. A favorite formula and a non-irritating one is:

Menthol .....gr. 2
Eucalyptol .....gr. 1
Benzoinol .....oz. 1

Various snuffs have been used, but are seldom agreeable to the patient. The following is by Hollopeter:

Morphin sulphate .....gr. 4
Boric acid .....dr. 1
Powd. camphor .....dr. ½
Powd. starch .....dr. 4

The suprarenal gland extract, already alluded to, is one of the most promising remedies for local application. A 5 to 10 per cent filtered solution is usually used. It is a most powerful astringent, but non-irritant. It spoils quickly and must be

freshly made for every application, unless a stable solution can be devised. Ingals says the following will keep for several weeks:

Adrenal	gr. 15
Boric acid	gr. 4
Cinnamon water	dr. 1
Camphor water	dr. 2
Boiling water	oz. ½

Macerate four hours. Filter.

Somers (Merck's Archives) recommends the following as a permanent solution, giving excellent results in hay-fever:

Adrenal	gr. 20
Carbolic acid	gr. 2
Eucain, B	gr. 5
Distilled water	dr. 2

This may be used to good advantage alternately with orthoform, the new local anesthetic. Chloretone has also been recommended for hay-fever, and its manufacturers have put on the market a suprarenal liquid with chloretone which should prove effective in these cases. Orthoform seems to be indicated in these cases, and should give good results.

In spite of local and general treatment, some patients are unrelieved. Such patients, especially if debilitated, should be advised to go, during the hay-fever season, to some place where they will escape the annual attack. This may usually be found by a sea voyage or a sojourn in the mountains or piney woods.

HEADACHE.

Etiology and Symptomatology.—No condition, which calls for the advice of a physician, is more common than headache. Too often it is treated empirically without a rational conception of its etiology. It is always a symptom, never a disease in itself. For convenience, headaches will be considered under their most common causes.

(1) *Toxemic Headaches* may be due to infectious diseases, uremia, lithemia, syphilis, diabetes, alcoholism, malaria, indigestion and constipation, rheumatism, etc. The headache of fevers is usually generalized and associated with constitutional disturbance; that of uremia is profound and overwhelming with albuminous and scanty urine.

The *gouty or lithemic headache* is usually paroxysmal, the pain is severe, it attacks the forehead (less often the temporal or occipital regions). It is often a typical *hemicrania,* (migraine), and associated with intolerance of light and sound, nausea and vomiting, and a slow pulse of high tension. That *migraine* is always due to the gouty diathesis may be denied, but its type follows that just given. An attack may last only two or three hours or a day or more; usually the pain disappears at night.

The headache of *syphilis* is localized to a definite region, deep-seated, often unilateral and worst at night; there may be an associated mental torpor. In *diabetes* there is the history of excessive urination and sugar in the urine. In alcoholism it follows excesses.

Headaches due to *gastric derangements* or constipation are generally frontal, but may be occipital, vertical or general; usually they are dull, with a sense of fullness, but may be sharp; there are evidences of the causative trouble, as coated tongue, anorexia, flatulence, etc. *Rheumatic* headaches are superficial, pervading the muscles of the scalp and neck more than the deeper structures.

(2) *Nervous Headaches* occur most often in neurasthenic and hysterical women, are often sharply localized, and affect forehead, occiput and vertex most. According to Patrick, the pain is more a sense of discomfort and distress than an actual hurt. A peculiar form of nervous headache is the "clavus hystericus," the sensation being that of a nail driven into the vertex; it occurs in hysterical women. Patrick calls attention to the facts that the neurasthenic headache does not interfere with sleep, and is very "amenable to diversion." It also tends to be constant or nearly so. It may occur as a reflex of uterine or ovarian disease.

(3) *Anemic Headaches* chiefly involve the forehead and top of the head. They are due to congestive states of the brain caused by heart disease and asthma. The pain is usually throbbing and is increased by stooping, coughing, violent exertion or any cause increasing the cerebral congestion.

(4) *Ocular Headaches* are generally caused by eyestrain. Casey Wood believes 40 per cent of all headaches and 80 per cent of the frontal headaches are produced wholly or in part

by this cause. The pain is frontal or temporal, is sometimes accompanied by aching in the eyeball and a deep intracranial ache; is more likely to be dull and heavy than acute and usually appears at a definite length of time after close work with the eyes; this may be either minutes or hours. There are usually associated and quite distinctive eye symptoms. The severe pain of glaucoma requires special mention. It is associated with dimness of vision and restriction of the visual field.

(5) *Catarrhal Headaches* may be caused by nasal and pharyngeal diseases. In suppurative inflammations of the sinuses pain may be severe. Usually it is dull, heavy and persistent and felt in the frontal region. Carious teeth may excite a one-sided headache, neuralgic in type.

(6) *Organic Headaches* are due to structural changes within the cranium. The most common of these causes are meningitis and brain tumors,—especially the latter. Tumors frequently produce defects of vision (sometimes sudden blindness) and of hearing, speech and taste; also vertigo, nausea and vomiting, epileptiform convulsions, local and general palsies, etc.

TREATMENT.—Find and treat the cause. In toxemic headaches, due to the infectious diseases, uremia, syphilis, gout, rheumatism, malaria, etc., the indications are plain. We must treat the disease, and if we do so successfully we shall cure the headache. In the headaches of this class which are evidently due distinctively to a lack of balance between absorption and excretion, we must endeavor to restore this balance. This is especially true in the *migraine* of uric acid origin. First, we must reduce the amount of uric acid producing food; second, we must rid the body of the irritant. The diet should therefore consist largely of milk, cereals and vegetables, and red meats, tea, coffee, alcohol and sweets should be forbidden, or at least reduced in quantity (see article on Gout), adjusting, however, the relative quantities of proteid and carbohydrate to the nutritive needs of the patient. To promote excretion we advise systematic exercise, massage, the cool morning bath and an occasional hot or Turkish bath.

Medicinally, Haig considers sodium salicylate a specific, and gives it in repeated doses as a supplement to dietetic treatment. Brunton and others, who do not accept the uric acid theory,

also consider this a most valuable remedy, but advise an occasional mercurial and morning salines, to clear away the toxins from the cerebral blood supply. In recurrent headaches the latter gives the salicylate, in small repeated doses, three times daily. For a decided effect he thinks it is more effective when combined with potassium bromid. He gives 15 to 30 grains of the former with 10 to 30 of the latter at bed time. To obviate any depressing effects he adds a little aromatic spirits of ammonia to the prescription, as follows:

Sodium salicylate .....dr. 3—4
Potassium bromid .....dr. 2—4
Spts. ammon. arom. .....dr. 2
Peppermint water, enough to make.....oz. 6

Tablespoonful at bedtime, the night before the expected attack.

If the salicylate is to be given regularly over a long period of time it should be combined with iron, on account of its tendency to produce anemia. Solis-Cohen recommends:

Sodium salicylate .....dr. 4
Glycerin .....oz. 2
Oil wintergreen .....m. 20
Tinct. iron chlorid .....dr. 4
Citric acid .....gr. 10
Sol. ammon. acetate, enough to make.....oz. 4

One dessertspoonful three times a day in water.

The potassium and lithium salts are also indicated in these cases and should be administered with a large quantity of water.

Many physicians report failures from treatment of migraine based upon its uric acid origin. Patrick prefers cannabis indica. He commences with three or four drops of the fluid extract after each meal, and increases the quantity rapidly until the physiological effect is reached; the dose is then decreased and kept just within the point of tolerance.

In the spastic form of hemicrania or migraine, in which the pupil of the affected side is dilated and the face is pale, nitroglycerin ($^1/_{100}$ grain) or inhalations of amyl nitrate may be given with benefit. In the paralytic form, with contracted pupil and flushed face, ergot is recommended.

When pain is severe, caffein and the coal-tar drugs, phenacetin, antipyrin, acetanalid, etc., may be required to obtain relief. The ordinary 5-grain "migraine pill," consisting of acetanilid,

sodium bicarbonate and caffein, is effective. The following formula of C. L. Kerr is satisfactory and produces little depression:

Acetanilid	gr. 3
Ammonium chlorid	gr. 1
Caffein citrate	gr. ½
Sodium bicarbonate	gr. ¼

Make tablet or capsule.

Robin recommends:

Caffein	gr. 6
Cocain hydrochlor.	gr. 3
Antipyrin	gr. 75
Potassium bromid	gr. 75
Powd. guarana	gr. 45

Make 10 powders. Give as required.

A formula used in the Philadelphia hospital is:

Acetanilid	gr. 2½
Spts. ammon. arom.	m. 15
Tinct. cardamom comp.	m. 15
Alcohol	m. 15
Elixir orange, enough to make	dr. 1

One teaspoonful as a dose.

Cold compress to the head, inhalations of camphor or "smelling salts," and bathing the face with the following *eau sedatif* give some comfort to the patient:

Sodium chlorid	oz. 1
Spts. camphor	oz. 1
Ammonia water	oz. 2
Water	pint 1

Apply locally.

In *rheumatic headaches* potassium iodid is the favorite remedy. Brunton advises that it be given at first in small doses, increased to 10 to 30 grains three times a day. In mixed cases he combines it with the mixture of sodium salicylate, potassium bromid and aromatic spirits ammonia. A local application recommended in rheumatic and neuralgic headaches (Jour. Am. Med. Asso.) is as follows:

Chloral	oz. 1
Camphor	oz. 1
Oil cajuput	oz. 1

To be applied locally.

Indigestion, of course, requires relief by appropriate treat-

ment and restricted diet. Following indiscretions of diet an emetic or lavage will correct the headache due to an overloaded stomach. In headaches due to constipation a quickly acting saline cathartic, as Epsom or Rochelle salts, usually brings relief. It is best to discourage the habit, which most of these patients have, of depending upon headache powders bought at the drug store for temporary relief. Diet and exercise will cure most of them.

In nervous headache it is of primary importance to treat the neurasthenic or hysterical state which is responsible for it. Change of occupation, rest (in severe cases Weir Mitchell's rest cure), plenty of nutritious food, massage, hydrotherapy and electricity are generally the best methods of treatment in these cases. If there is pelvic disease, or if the headache is a reflex from another diseased organ attention should be given to the causative malady.

Strychnin is probably the most useful drug. It should be given in doses of good size ($^1/_{40}$ to $^1/_{30}$ grain, three times a day). It may be given in association with or combined with iron, arsenic, phosphorus, etc., as:

Strychnin sulphate .....gr. $\frac{1}{4}$—$^1/_3$
Sol. potassium arsenite .....dr. $\frac{1}{2}$—1
Sol. iron pepto-manganate .....oz. 6
Tablespoonful three times a day.

Or—

Zinc phosphid .....gr. $1\frac{1}{2}$
Reduced iron .....gr. 24
Ext. nux vomica .....gr. 6
Make 24 capsules. One after each meal.

The coal tar drugs often fail to give relief in headaches of this class. Potassium or sodium bromid is most effective. It should, however, be given in full doses (20 to 40 grains three times a day). Other nervous sedatives sometimes of use are hyoscyamus, the valerianates, assafetida and monobromated camphor. Below are given sample prescriptions:

Potassium bromid .....dr. 2—3
Spts. ammon. arom. .....dr. 2—4
Syrup orange .....oz. $1\frac{1}{2}$
Chloroform water, enough to make.....oz. 4
Tablespoonful repeated in three or four hours.

Or

Monobromated camphor .....gr. 15
Acetanilid .....gr. 45
Caffein citrate .....gr. 10

Make 15 capsules. One every two or three hours.

Or

Antipyrin .....dr. 1
Potassium bromid .....dr. 3
Syrup orange .....dr. 5
Water, enough to make .....oz. 2

One teaspoonful every three hours until relieved.

Anemic headaches call for iron, suitable tonic treatment and the correction of the causative disorder. Cardiac cases may need digitalis, strychnin, etc. Asthma and chronic bronchitis, if present, should be relieved as far as possible, and the whole body put into the best condition possible.

Ocular headaches are usually cured by properly fitting spectacles. For temporary relief the patient should be confined to a darkened room. Casey Wood advises compresses of very hot or cold water, as the patient prefers, applied on a dripping towel to the closed eyes. These are to be changed frequently and continued for ten or fifteen minutes. These applications are renewed every hour or oftener as long as needed. The following mixture may be rubbed over the forehead or mixed with ice-water (1 part in 10) and laid over the closed eyes while the patient lies down.

Spts. lavender.....oz. 3
Alcohol .....oz. 3
Spts. camphor.....oz. 1

The ointment of veratrin or aconitin may be rubbed on the skin, cautiously, or the following liniment may be used:

Chloroform .....oz. ½
Camphor .....dr. 1
Tinct. aconite.....dr. 1
Oil peppermint.....dr. 1
Alcohol .....oz. 1

Shake well and apply every 2 to 3 hours.

The catarrhal headache demands local treatment to the nasal and pharyngeal cavities.

HEART, DEGENERATION OF—See Myocarditis.

HEART, PALPITATION OF THE.

DEFINITION.—A too rapid action of the heart, either regular or irregular, that is perceptible to the patient but unaccompanied by any organic disease.

ETIOLOGY.—Nervous palpitation is more common in women than in men. In the former it is more apt to occur at puberty or the menopause, while in the latter it is more frequent at or after middle life. Mental excitement due to anxiety, grief or fright, diseases of the uterus and the excessive use of alcohol, tobacco, tea and coffee, are prominent etiological factors. It is frequently caused by gastric disturbances. Anemia may be a prominent cause.

SYMPTOMS.—The chief symptom is the unusual action or beating of which the patient is painfully cognizant. The attack may occur suddenly, the only warning being a blanching of the countenance. It may be mild or severe in character and last from a few minutes to hours or even days. The pulse is rapid, sometimes reaching 160 per minute. Accompanying the rapid heart action is a feeling of weakness in the epigastrium and sometimes nausea. The cardiac impulse may be found somewhat diffuse and heaving.

DIAGNOSIS.—Nervous palpitation may be differentiated from myocarditis and fatty degeneration by the normal action of the heart during the periods of intermission. In the palpitation associated with organic disease the presence of murmurs between the attacks is sufficient to establish the diagnosis.

PROGNOSIS.—It does not cause death.

TREATMENT.—For relief of the paroxysm the patient should at once be placed on a couch or in bed where absolute rest may be obtained and the clothing loosened to allow unimpeded respiration. A confident manner and the kindly assurance that the trouble is not serious will do much to restore the mental equipoise of the patient. The attacks may sometimes be quickly arrested by pressure on the pneumogastric or over the ovarian region. A draught of cold water or an ice-bag applied to the precordial region will often afford immediate relief.

The administration of sodium bromid is useful. In case of indigestion it may be combined with the aromatic spirits of ammonia and aromatics. Hyoscyamus, camphor monobromate and passiflora may be used for sedative effect. In hysterical cases the elixir of the valerianate of ammonium may be extremely useful, given in teaspoonful doses. Nitroglycerin acts quickly and will overcome any tendency to pulmonary congestion by dilating the blood vessels.

To prevent recurrence it is necessary to remove so far as possible the exciting factors. Indigestible articles of food should be eliminated from the diet and the use of tea, coffee and tobacco prohibited. Any diseased condition that is reflexly a cause should be properly treated. Some cases may require the rest cure.

HEART, VALVULAR DISEASES OF THE.

ETIOLOGY.—The majority of cases of valvular disease are a sequence of acute endocarditis. Probably one-half of all cases are a result of rheumatism or the rheumatic diathesis. One class is slow in developing and may be considered chronic from the beginning. These may be caused by the systemic poisons of malaria, chronic rheumatism and syphilis, or chemical irritants like uric acid, alcohol and lead. The prolonged muscular strain of athletes or laborers required to do heavy lifting may produce an overtension of the valves. This is more liable to occur if associated with over-eating and drinking. The aortic valve is most commonly affected when a strain is the cause.

Dilation of the ventricles or aorta may so stretch the valves that complete closure is impossible, thus producing incompetency. Malformation of valves and hereditary influence may be potent factors in producing the disease. More than one-half of all cases of valvular disease occur under the age of thirty.

PATHOLOGY.—In most instances the disease is limited to the valvular endocardium. In the pathological lesion there may be thickening followed by retraction, adhesion, calcification and fatty degeneration. All of these conditions may be present or only a part of them. In all cases there is *thickening* caused by the over-production of fibrous connective tissue. This may take place at the edges or bases of the valve segments, or may include the whole. If the auriculo-ventricular valve becomes

affected the auricular surface is the seat of the inflammation. In case the ventricular valve is diseased, the ventricular side is first the seat of the pathological change. The morbid condition may extend to the chordae tendinae and papillary muscles.

As the connective tissue is formed, it contracts and causes the edges of the valve to curl and retract. The aortic valve may be drawn back and fixed while the mitral may be pulled well into the ventricle by the retraction of the papillary muscles. Occasionally congenital perforations of the aortic and pulmonary valves are found that have given rise to signs interpreted as those of true regurgitation. As the inflammation extends, adhesions may take place between the segments beginning at the base. This results in preventing complete opening and closing. Calcification may occur producing a firm, bony ring on the valves partly closing the orifice, or there may be deposits on the free margins or nodular formation on the surface. With this may be associated atheroma, or the latter may occur without calcification. This condition may be present in the aorta and may extend to the coronary arteries. When the mural endocardium is affected it is usually an extension of the inflammation from the valves. Hypertrophy of the heart muscle takes place as the result of the lesion and, in long standing cases, degeneration.

Occurrence.—Valvular lesions of the right heart rarely occur primarily, but in a majority of cases are secondary to mitral or aortic disease. The slight percentage that do are mostly of congenital origin. It is claimed by Porter that many of the murmurs discovered in persons who live for many years thereafter are due neither to stenosis nor incompetency, but to congenital perforation of the valves. The aortic valve is not infrequently affected in this way.

Of all valvular lesions mitral incompetency occurs most frequently, while a similar defect of the aortic valve is next. Both are more common in males than females due probably to greater physical exertion and exposure. Mitral stenosis is found chiefly in young persons, especially women, and in nearly as many cases as aortic incompetency. Aortic stenosis occurs in older people than insufficiency and is the rarest of aortic or mitral lesions. It is not uncommon to find stenosis and insufficiency of either

valve, the mitral being affected in a greater number of instances while there may be stenosis in one and incompetency in the other, or different combinations, including perhaps a double defect in either or both.

MECHANICAL RESULTS.—Of the changes that take place in the heart with valvular disease it may be stated in general that undue arterial or capillary resistance will produce hypertrophy of the left ventricle, while obstruction in the lungs will cause hypertrophy of the right. If both ventricles are enlarged it can safely be assumed that a valve first became defective on the left side.

In aortic incompetency, a volume of blood returns to the left ventricle through the leaking valve, at the same time a fresh supply is delivered from the left auricle through the mitral orific. The pressure from the increased amount causes dilation, which is immediately followed by hypertrophy due to the increased work of the muscle in attempting to overcome greater resistance and empty the ventricle. So long as the circulation in the coronary arteries and veins is not lessened and the muscle is properly nourished it performs its task satisfactorily. In time, however, a secondary dilation occurs, the mitral valve gives way, and dilation and compensatory hypertrophy of the left auricle results. The effect on the lungs and right heart are the same as in primary mitral insufficiency.

In aortic stenosis, the greater work necessary to force the blood through the contracted orifice results in hypertrophy of the left ventricle. The overworked muscle yields after a greater or less period and dilation ensues followed by regurgitation at the mitral valve. Further results are the same as in aortic incompetency.

When the mitral valve becomes incompetent the regurgitation of blood into the left auricle causes dilation which is followed by a compensatory hypertrophy. The enlarged auricle forces a greater quantity of blood into the left ventricle which dilates and then hypertrophies to perform the additional work.

When hypertrophy of the left auricle can not keep pace with dilation the blood is not emptied from the pulmonary veins but is dammed back into the lungs, producing stasis and, in time, sclerosis. The increased resistance afforded by the pulmonary congestion produces hypertrophy of the right ventricle succeeded

by dilation which renders the tricuspid valve incompetent. The right auricle then dilates, which permits reflux of blood into the veins resulting in general venous congestion.

Stenosis of the mitral orifice is followed by hypertrophy of the left auricle. This, in time, dilates, the vascular tension in the pulmonary veins is increased and the same backward effect is produced in the lungs and right heart as in incompetency.

AORTIC INCOMPETENCY; AORTIC INSUFFICIENCY; AORTIC REGURGITATION.

Symptoms.—This form of valvular disease may exist for years, when fully compensated, without giving rise to uncomfortable symptoms and may be discovered accidentally during an examination for other conditions. Compensation is considered to be more complete than in any other lesion and it is due to this that the patient suffers so little inconvenience.

When marked hypertrophy exists undue exercise or mental excitement may bring on throbbing headache, vertigo and tinnitus aurium. Dull headache, flashes of light before the eyes, and pallor of the face, due probably to anemia, are among the earliest symptoms. The patient usually feels faint on rising suddenly. Hot flashes and drenching sweats sometimes occur. Palpitation is often caused by slight exertion even when the pulse remains slow. It may be accompanied by cardiac distress. Sleep is frequently disturbed by dreams. The patient is often peevish and irritable and mental derangement may result with suicidal tendency. In many cases, long before the failure of compensation, there may be much discomfort and distress from pain. This may be of a dull aching character over the precordial region, or sharp and extending to the shoulders and down the arms, particularly the left one. Rarely there may be attacks of true angina pectoris.

When compensation fails the retardation of the flow produces pulmonic congestion and venous stasis, which causes dyspnea and sometimes cough. The dyspnea is worse at night and is increased on exertion. As the symptoms increase in severity the patient may be able to rest or sleep only when propped to a semi-sitting posture in bed. Edema and cyanosis, when present, are the result of the complication of mitral insufficiency. Sud-

den death is more common than in all other forms of heart disease, probably due to involvement of the coronary arteries.

PHYSICAL SIGNS.—*Inspection.*—The apex impulse is downward, sometimes as low as the seventh interspace and outward to the left, in some cases, to the anterior axillary line. There is bulging of the precordial space, especially in children. The carotids throb violently and the diagnosis can often be made across a room from this sign alone. Pulsations may be seen in the subclavians, brachials, radials and even in the popliteal and dorsalis pedis. Throbbing of the aorta may be detected in the supra-sternal notch or the second right interspace. By rubbing gently the forehead with a finger or pencil alternate paling and flushing may be seen, due to capillary pulsation. There is marked heaving of the chest and bobbing of the head, and in extreme cases a flushing of the hands and face at each ventricular contraction.

Palpation.—The impulse is forcible and heaving. Over the mid-sternum a thrill diastolic in time may be felt. During the stage of dilation the impulse is weak and variable. The arteries are elongated and consequently tortuous. The pulse known as Corrigan's, or water-hammer, is often pathognomonic. It is short, great in volume and quickly recedes on striking the finger. Raising the arms perpendicularly produces an exaggeration. Irregularity is a sign of failing compensation.

Percussion.—The area of dullness is increased downward and to the left. It is larger than in any other form of valvular lesion.

Auscultation.—Over the aortic area or on the left side of the sternum at the fourth costal cartilage may be heard a diastolic murmur, soft, long-drawn and blowing in character, though sometimes loud and harsh. Its line of transmission is downward to the left of the sternum toward the apex. The murmur may occupy only the earlier portion of diastole, but usually the second sound is obliterated.

Other murmurs may be associated as,—a systolic murmur in the mitral area due to dilation when compensation fails and a presystolic rumbling murmur at the apex, due, according to Flint, to the flapping of the mitral valves that are not forced against the ventricular wall because of the dilation. A short

rough systolic murmur is frequently heard at the second right costal cartilage transmitted to the vessels of the neck, probably caused by roughening of the valvular segments or otherwise of the aorta.

Pressure of the stethoscope on the femoral artery may elicit the double murmur of Duroziez, or the short, sharp systolic sound described by Traube.

AORTIC STENOSIS.

SYMPTOMS.—So long as compensation is maintained, stenosis of the aortic orifice may be present for many years without giving rise to a special train of symptoms. When secondary dilation occurs, the heart fails to supply the brain and the peripheral portions of the body with sufficient blood. This insufficient supply produces anemia of the cerebral lobes and gives rise to pallor, syncope, headache and dizziness. The symptoms may be first noticed after severe muscular exertion or the excessive use of alcohol and tobacco. The anemia is apt to cause much disturbance during sleep. Exercise may bring on a tightness about the chest and precordial pain. Some edema of the feet is common, but is usually not excessive. If insufficiency of the aortic valve takes place the symptoms of that condition may be added to those already mentioned. Portions of the valve segments may loosen and be swept into the blood current as emboli. These may be carried to the brain, spleen, kidneys and other organs.

PHYSICAL SIGNS.—*Inspection.*—A slow, strong, heaving impulse may be discovered below and to the left of the normal position. In cases where but little hypertrophy exists the apex impulse may show but little change. It may not be perceptible in dilation or with emphysema.

Palpation.—A systolic thrill is felt over the upper portion of the sternum, especially in the aortic area. It is transmitted along the course of the vessels. In the stage of hypertrophy it may be a strong, purring vibration, while in that of dilatation it is feeble and indistinct. The pulse is small, regular, slow to rise and slightly diminished in frequency.

Percussion.—If the lesion is not complicated by emphysema the area of dullness is increased laterally to the left and down-

ward. There is also dulness upward to the left of the sternum if the right auricle becomes hypertrophied.

Auscultation.—A systolic murmur of maximum intensity is heard at the second right intercostal space, and is transmitted into the carotids and along the course of the aorta. It is usually rough and loud, but in failing compensation may become soft and musical. The aortic second sound is indistinct and may be entirely muffled.

MITRAL INCOMPETENCY; MITRAL REGURGITATION, MITRAL INSUFFICIENCY.

SYMPTOMS.—Hypertrophy may keep pace with the development of the valvular lesion so that complete compensation is present for perhaps a long period without the appearance of any particular symptom. Shortness of breath brought on by some slight exertion, climbing stairs, rapid walking or excitement, is the first symptom, and it may be the only one present for some time. The lungs become congested, beating and palpitation ensue, and there may be a short hacking cough with frothy or even bloody expectoration. This condition soon disappears only to return on overexertion. If compensation is slightly imperfect the pale and pinched face, dusky lips and ears, together with the dilated capillaries of the cheeks, present a typical picture of heart disease.

With the failure of compensation the pulmonary congestion is greater and permanent. Dyspnea is constant and readily increased on exertion. It may become so marked that the patient is unable to lie down and can sleep only in a sitting or semi-reclining posture. The yielding of the right heart produces venous engorgement and cyanosis, followed by dropsy. The liver and spleen become congested and gastro-intestinal catarrh develops. The urine is scanty, albuminous and contains blood-cells and tube-casts. Dropsy begins in the feet and extends gradually upwards to the rest of the body. The distension of the legs and abdomen is sometimes of enormous proportions, the latter condition adding to the sufferings by augmenting the dyspnea.

Compensation may be partially or almost entirely re-established and the symptoms abate only to reappear in a few weeks,

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Compensation may be partially or almost entirely re-established and the symptoms abate only to reappear in a few weeks,

months or rarely longer. When compensation cannot be restored the system gradually yields in a progressively downward course.

PHYSICAL SIGNS.—*Inspection.*—In children the precordium may be prominent, especially over the second and third interspaces. The apex impulse extends downward sometimes as far as the sixth interspace and to the left, in some instances, to the anterior axillary line. It is wavy and has an increased area.

Palpation.—During the period of compensation the apex impulse is forcible and even. When this gives way it becomes weak and irregular. The pulse in the early stage is full and regular; later it becomes feeble, easily compressible, and variable.

Percussion.—Hypertrophy of the right and left ventricles is revealed by the increased area of dullness which may extend even to the left anterior axillary line and to the right of the sternum.

Ascultation.—A systolic murmur, blowing in character, low or high in pitch and rarely musical, is heard with maximum intensity at the apex. In some instances it can be heard best at the left border of the sternum. It is transmitted to the axilla and can be heard also in the back to the left of the vertebral column at the angle of the scapula. Position may modify the intensity as it may be present when lying down, but disappears on rising. In the second left interspace is heard an accentuation of the pulmonary second sound. The first sound of the heart may be entirely replaced by the murmur.

MITRAL STENOSIS.

SYMPTOMS.—As in mitral incompetency the stenosis may exist for a long time without giving rise to any symptoms. Unusual exertion may bring on dyspnea as the first indication of an abnormal condition. Portions of the valve leaflets may be swept away and carried by the circulation to the brain, producing cerebral embolism. After compensation fails the symptoms are similar to those of mitral incompetency. Pulmonic congestion and edema, constant dyspnea, frothy or bloody expectoration, true hemoptysis, cardiac palpitation and dropsy are alike present. The latter is not so apt to be a general anasarca as in insufficiency, but rather an ascites. The liver may be congested and enlarged for a long time.

PHYSICAL SIGNS.—*Inspection.*—The apex impulse is but

little, if at all, displaced. In children the lower portion of the sternum and the fourth, fifth and sixth costal cartilages are prominent, caused by the hypertrophy of the right ventricle. Along the left border of the sternum in the third and fourth left interspaces an impulse may be seen in thin-chested persons. After dilatation the veins of the neck become engorged.

Palpation.—Inside the nipple line in the fourth and fifth interspaces on the left side may be felt a presystolic fremitus. It consists of a series of thrills, increasing in intensity and ending in a sudden shock at the time of the impulse. As a rule it can be felt only in a small area and better during expiration. The presytolic thrill is considered pathognomonic and may be present when other physical signs are lacking. The cardiac impulse is felt strongest over the enlarged right ventricle.

The pulse during compensation is small, slow and regular. If the orifice is much narrowed it may be weak and irregular. After the failure it is feeble, small, and lacking in regularity. Its volume may be less on the left side.

Percussion.—The area of dullness is increased upward and both to the right and left of the sternum. It may extend as high as the second rib and two inches to the right of the sternal margin.

Auscultation.—In the mitral area a little to the right of and above the apex beat is heard a presystolic murmur occurring synchronously with the thrill. It occurs during the latter part of diastole, or when the left auricle is contracting. The area of transmission is small. The murmur is loud and of a rough, grinding character, high in pitch. The shock of termination is heard simultaneously with the first sound. The second pulmonary sound is usually accentuated.

TRICUSPID INCOMPETENCY.

Symptoms.—About two-thirds of all cases are of relative insufficiency due to valvular disease of the mitral or aortic orifices. The principal symptoms are dyspnea and hacking cough from the pulmonary congestion, a congested liver and spleen, cyanosis, and general venous engorgement with dropsy. The latter is common but not present in all cases.

Physical Signs.—*Inspection.*—An epigastric pulsation is

seen below and to the left of the ensiform cartilage. Occasionally pulsations may be detected in the second and third right intercostal spaces, due to the veins of the neck. Regurgitation of the blood into the veins produces a pulsation synchronous with the contraction of the ventricles which is considered pathognomonic of tricuspid incompetency. It is best seen in the right jugular. After the valves of the vein give way the pulsation may be demonstrated by pressing it upward from the clavicle with the finger to empty the blood for several inches. It will then fill from below in increasing waves synchronous with systole.

Palpation.—An impulse may be felt below the ensiform cartilage in the epigastric region; also the pulsation of the regular veins. There may be a pulsation in the liver, systolic in time, which may be shown by placing one hand in front over the liver and the other at the right side over the ribs, thus grasping the organ as far as possible bimanually.

Percussion.—The area of dullness may be increased upward and to the right of the sternum.

Auscultation.—A systolic murmur, soft and low in pitch, is heard with maximum intensity at the lower end of the sternum or at the junction of the fourth, fifth and sixth costal cartilage on the left side. It may be transmitted a short distance to the left and also to the right. The second pulmonic sound is accentuated.

TRICUSPID STENOSIS.

Symptoms.—It may be secondary to mitral disease and the symptoms are those of the two morbid conditions. There is general venous stasis and marked cyanosis of the face and lips. In the later stages the dropsy is extreme and persistent.

Physical Signs.—*Inspection.*—In some cases it is possible to discover a weak jugular pulsation, presystolic in time, caused by the contraction of the right auricle.

Palpation.—Over the right ventricle a presystolic thrill may be detected.

Percussion.—Dullness extends to the right of the sternum at the base of the heart.

Auscultation.—A presystolic murmur is heard over the lower part of the sternum at the right border.

PULMONARY INCOMPETENCY.

PHYSICAL SIGNS.—A diastolic murmur may be heard in the second left interspace that is transmitted down the sternum. There is hypertrophy of the right ventricle. Later in the disease additional signs are the jugular pulse, venous stasis, cyanosis, and edema. If the case is one of relative insufficiency, either the aortic or mitral valve, or possibly both, may be defective. The pulmonary second sound is accentuated, followed by the murmur.

PULMONARY STENOSIS.

SYMPTOMS.—Cyanosis and dilatation of the systemic veins are the principal symptoms. The patient may have had cyanosis and dyspnea since birth.

Palpation and Percussion.—A thrill, systolic in time, may be felt over the base in the pulmonary area. The right ventricle is considerably enlarged.

Auscultation.—A systolic murmur, harsh and loud in character, may be heard in the second left interspace near the sternum which is transmitted a short distance toward the left shoulder. It may be heard in the back between the shoulders. The pulmonary second sound is weak. A diastolic murmur in the same area may indicate that pulmonary regurgitation is also present.

DIAGNOSIS.—The differential diagnosis between the different forms of valvular heart disease is illustrated in the table on the following page.

PROGNOSIS.—The prognosis varies with the stage of the disease. There is a wide difference in the probable length of life between efficient and broken compensation. Persons having valvular lesions properly compensated have been known to live half the anciently allotted period of life after the discovery was made, but as a rule the term is only a fraction of this. The age, mode of life, state of the arteries and other factors must be considered in the estimate. In cases with sound arteries and freedom from pulmonary, hepatic and renal congestion, when the valvular defect has existed for several years without change, the prognosis is favorable for uninterrupted compensation during a number of years. Mitral incompetence is the most favorable as to life,

DIFFERENTIAL DIAGNOSIS OF DISEASES OF THE HEART.

INSPECTION	AORTIC INCOMPETENCY	AORTIC STENOSIS.	MITRAL INCOMPETENCY	MITRAL STENOSIS	PULMONARY INCOM'TENCY	PULMONARY STENOSIS	TRICUSPID INCOM'TENCY.	TRICUSPID STENOSIS.	ANEMIC MURMURS.
	Apex beat downward and outward; increased area of impulse; throbbing carotids; capillary pulse.	Impulse less than in incompetency and apex beat not so far displaced.	Wavy impulse increased in area; apex beat rarely below sixth interspace, but may extend to anterior axillary line.	Prominence of sternum at lower end and 4th to 6th costal cartilages, impulse not marked.	Symptoms late in appearance; jugular pulse; cyanosis; edema.	Cyanosis; dilated veins.	Epigastric pulsation; jugular pulsation.	Cyanosis; occasionally a weak jugular pulsation.	Pallor of skin and lips.
PALPATION	Impulse strong, heaving; tortuous arteries.	Systolic thrill over middle of the sternum; impulse marked.	With compensation impulse even and strong; without, feeble and diffuse.	Presystolic thrill in 4th. and 5th left interspaces.	Jugular pulse late in disease.	Systolic thrill at base.	Pulsation of veins; ventricular impulse at xiphoid cartilage	Sometimes a presystolic thrill over right ventricle.	Impulse not displaced and can not often be felt.
PERCUSSION	Dulness greatly increased downward and outward to left.	Dulness somewhat increased laterally to left and downward.	Dulness increased transversely from right of sternum toward clavicular line.	Dulness increased upward, and to the right and left of sternum at base.	Hypertrophy of right ventricle; dulness to right of lower sternum.	Hypertrophy of right ventricle.	Dulness increased upward and to the right of the sternum.	Dulness extends to right of sternum at base.	
ASCULTATION	Diastolic murmur in aortic area transmitted down left side of sternum.	Systolic murmur in aortic area transmitted to the carotids.	Systolic murmur at apex transmitted to axilla; also heard in back at angle of scapula; pulmonary 2d sound accentuated.	Presystolic murmur heard at the apex, loud and rough in character.	Diastolic murmur in pulmonic area transmitted down the sternum.	Systolic murmur in pulmonic area transmitted toward left shoulder; 2d pulmonic sound weak.	Systolic murmur at lower end of sternum transmitted to the right or left.	A presystolic murmur is heard at lower right border of sternum.	Systolic; heard at any orifice, but best in pulmonary area; not transmitted; soft, low in pitch; loudest in recumbent position; sound increased on violent cardiac action.
PULSE	Water-hammer pulse.	Small, retarded, infrequent.	At first full, regular, but small and soft; later, irregular.	Small, slow and regular or may be weak and irregular.	Not characteristic.	Not characteristic.	Not characteristic except the jugular pulsation		
PAIN	Quite marked, radiating to shoulder and down the arm throbbing headache	Occasionally anemic headache.	Not so marked as in aortic disease; great discomfort from dyspnea.	Not diagnostic; palpitation and dyspnea.			Discomfort caused by dyspnea.		
EDEMA	Slight.	Slight	Marked.	Less than in incompetency; ascites common.			Marked.	Extreme.	

next is aortic incompetence, but this is the most frequent cause of sudden death. When compensation fails the disease terminates in from three months to three years.

TREATMENT.—*Prophylaxis.*—As 40 to 50 per cent of the cases of acute endocarditis occur during the course of rheumatism and chronic valvular disease is the result in a majority of instances of the acute form, it follows that the "ounce of prevention" should be used at the time of the rheumatic attack. Though the salicylates act as a specific for rheumatism they do not prevent the serious concurrence of endocarditis in a large number of instances. For this reason the additional treatment by alkalies is advocated by many. The acetate or citrate of potassium in 20 to 30 gr. doses may be given every three hours or perhaps bicarbonate of potassium (30 to 40 gr.) with 5 grains of citric acid every two hours until the urine becomes alkaline will give more satisfactory results. Much smaller doses may be sufficient to maintain the alkalinity.

Complete physical rest is of great importance during and after the attack. Even if there is no endocardial manifestation of the infection it should be insisted upon. Patients, children especially, are often allowed to sit up and walk about after the symptoms abate but before the poison is entirely eliminated or the heart has recovered its tone. As a caution against relapses from chilling the skin on account of the profuse perspiration, patients should sleep between woolen blankets. Cardiac complications may sometimes be thus averted.

The heart should be carefully watched and guarded subsequently and during the course of tonsillitis, erythema, pericarditis, and pleurisy. Persons with the rheumatic diathesis should be limited to a proper diet and required to take regular exercise but to avoid undue exposure. At the first sign of an impending acute attack the salicylates should be administered.

As alcohol and tobacco are important factors in causation in some cases they should be interdicted when a tendency to heart disease exists.

The poison of syphilis and the gonococcus may be active in producing cardiac complications. Proper treatment will do much toward lessening this liability. In cases where the lesions are produced by heavy lifting in persons perhaps insufficiently

nourished or from prolonged muscular exertion by athletes the mischief may be done before the physician is consulted. Prolonged rest may however be curative if the strain is not severe.

Good advice can be given by the physician to those suspected of having a hereditary tendency to heart disease, in regard to the choice of an occupation, the correct manner of living and the control of the emotions.

Treatment During Compensation.—When organic heart disease with compensation is discovered accidentally or otherwise the question is at once raised of the advisability of informing the patient in regard to his true condition. One author thinks it is a "happy circumstance" that permits its discovery to the patient while another nearly always informs him that "his trouble is purely a functional one" that may become organic unless certain laws of health are observed. It must be apparent to the observing physician that no general rule is applicable in these cases. Circumstances and individual characteristics ought to be carefully considered in giving or withholding the exact information. It would undoubtedly do great harm to the neurotic or easily disturbed individual or even to the young who stand in awe of death to be informed that they had incurable heart disease or heart disease at all. On the other hand, to the individual disposed to accept conditions as they arise the knowledge would be of great value and act as a stimulus to guard against the loss of compensation. If the patient is not duly informed or given at least a hint the physician is handicapped in giving advice. Sometimes it may be best to inform a near relative or member of the family who may perform valuable services in restraining the patient in various ways that would otherwise be highly injurious.

The patient should follow an occupation suited to his impaired physical condition. Exhausting labor of any kind or any business that causes worry and mental strain should be avoided. Running up stairs, working with the arms raised above the head, or straining at stool may all be productive of harm. The fear of overdoing should not however prevent regular exercise and of sufficient amount. Persons confined to indoor life should systematically do a certain amount of walking every day.

The method of Oertel is applicable in such cases. To follow this the patient is instructed to walk a certain distance on level ground, making it a point to travel a little further each day. At the first sign of fatigue he should desist. If living in the city it is advisable to take the walk along a street-car line so as to be able to return at any time. In the country a carriage might accompany him. After becoming accustomed to the exercise he can gradually begin the ascent of hills. Mountain climbing is not to be recommended because of the rarer conditions of the atmosphere which are liable to cause dyspnea whether exercising or not. It is important that exercise of any kind be kept within proper limits. If it cause dyspnea, palpitation or cardiac distress the danger line is reached.

An outdoor life, not only because of greater uniformity of exercise but also on account of better oxygenation, is more apt to maintain the integrity of the heart muscle.

If syphilis is present it should receive prompt treatment by the mercurials and iodids. Great care should be exercised to prevent "taking cold" as every attack of bronchitis puts an additional burden on the heart. As exposure and fatigue may precipitate an attack of rheumatism it is highly important to avoid them.

Climate is of importance. Extremes of heat and cold are to be avoided. An equable temperate climate is best. Persons living in the north do well to spend the winter in the south. High altitudes are contraindicated as the right heart first becomes overtaxed.

The skin ought to be kept in excellent condition by daily sponge baths, followed by friction. Hot baths of any kind are not to be used as they are too depressing. There is less risk from sudden temperature changes if woolen is worn next the skin during the entire year.

Medicinial Treatment.—A daily evacuation of the bowels is of importance. An occasional saline purge may be required or the use of the bitter mineral waters. The mercurials give better results in some cases. Deterioration of the general health or evidences of anemia may require tonics such as iron and arsenic. Prescriptions similar to the following are useful:

Tinct. iron chlorid	dr.	2½
Strychnin hydchlorid	gr.	½
Dilute phosphoric acid	dr.	5
Distilled water, enough to make	oz.	4

Two teaspoonfuls in water thrice daily, after meals.

Iron and ammonium citrate	dr.	2
Fowler's solution	m.	40
Tinct. nux vomica	dr.	2
Chloroform water	oz.	2
Distilled water, enough to make	oz.	4

Two teaspoonfuls thrice daily after meals.

Digitalis, though largely used, is not indicated in this stage.

The diet is by no means the least important part of the treatment. Foods causing flatulence are likely to create cardiac distress and the pressure upward on the diaphragm impedes free movements of the heart. Hence the carbohydrates should be taken only in limited amount. Bread, eggs, milk, fish, oysters, the lighter meats and other articles easily digested should form a large share of the diet. It is better to eat moderately and more frequently. The evening meal should always be light. Tea and coffee are injurious. Alcohol should be prohibited unless the patient is old and accustomed to its use, when a light wine is allowed by some after meals to stimulate digestion. Tobacco in any form should not be allowed.

Treatment During Failure of Compensation.—When the signs of failing compensation such as increasing dyspnea, palpitation, cardiac distress and irregularity appear the primary requisite of treatment is physical and mental rest. Only relative rest of the heart can be attained, but if the number of beats is lowered from 6,000 to 12,000 in twenty-four hours by changing from the erect to the prone position, it can readily be seen its work will be made much lighter. To profit fully by the beneficial effects of rest the diet must be at once changed to a liquid form. The bowels should be kept open by mercurials or salines. Proper rest for two or three weeks is sufficient to re-establish compensation in many instances. If the patient is anemic, chalybeate tonics may be given. If the heart is still weak and irregular after 15 or 20 days' rest, digitalis in small doses may be added to the treatment. The following is excellent:

Iron pyrophosphate	dr.	1
Tinct. digitalis	dr.	2
Strychnin hydrochlorid	gr.	½
Dilute phosphoric acid	oz.	1
Distilled water, enough to make	oz.	3

One teaspoonful three times daily.

If the symptoms of compensation are marked it may be necessary to give heart stimulants at once in addition to requiring absolute rest. In urgent cases the diffusible stimulants, as ether or aromatic spirits of ammonia, may be administered or a hypodermatic injection of strychnin or adonidin. When arterial tension is high nitroglycerin, $^1/_{100}$ grain every hour, will afford great relief. The application of several leeches over the sternum or depletion by venesection, as mentioned later, may be indicated for immediate relief of the dilated right ventricle.

Among the slower stimulants, digitalis easily ranks first in value. It is not only stimulating but tonic in action. The others are chiefly valuable as substitutes or adjuvants. Digitalis, by its action on the pneumogastric nerves, slows the action of the heart and adds to its force. The systole becomes more powerful while diastole is lengthened, thus permitting a greater quantity of blood to enter the ventricle. By means of the increased ventricular contraction more blood is carried to the heart muscle through the coronary arteries. This results in increased nutrition and vitality to the cells, thus helping to meet conditions necessary for increased work.

The left ventricle is continually contracted to some extent, which acts as a safeguard against further dilatation. This action of digitalis on the ventricle clearly indicates its use with little regard to the form of lesion, and that is in dilation. Some authorities object to its use in aortic regurgitation on the ground that the left ventricle is overfilled and the thin walls are unable to bear the strain, but the objection is not sustained by clinical results. There is greater reason for its non-use in myocardial degeneration with either mitral or aortic stenosis accompanied by an abnormally slow pulse. In a powerfully contracting heart with regular pulse the need is not for greater, but for less, action. In atheromatous degeneration of the aorta it must be used with care.

Digitalis is given usually in the form of the tincture or infusion. The dose of the former is 10 to 15 minims once in three to four hours, while that of the latter is one-half ounce given at the same intervals. It is important to obtain a good preparation of the drug. Better results are claimed for the infusion in dropsy but it has been suggested that it was from the larger dose as one-half ounce of the infusion is equivalent to 20 minims of the tincture. When the results are favorable from the administration of digitalis the heart becomes regular and slower yet stronger in action, while dyspnea and edema gradually disappear. The quantity of urine is largely increased while it is lighter in color and of lower specific gravity. The action of digitalis must be carefully watched for poisonous effects from accumulation or from overdoses. Untoward symptoms are nausea and vomiting, feeble pulse and wildly beating heart. These disappear in a short time on withdrawal of the drug.

It is not unusual for digitalis to produce gastric disturbances, even in moderate doses. In such cases a drug of similar action may be substituted. Strophanthus, convalaria majalis, spartein, adonidin and caffein are more or less frequently used for this purpose. Of these strophanthus is closest in action to digitalis but differs from the latter in not contracting the blood-vessels to the same extent. Furthermore, it does not have a cumulative toxic effect and is less likely to disagree with the stomach. The usual dose is 5 to 10 minims given three or four times daily.

Caffein is a more rapid stimulant than either of the above but not so durable in action. It causes the heart to strongly contract but has no special effect on the inhibitory nerves. Good results are obtained from its use in dropsy. The dose is 3 to 5 grains repeated every three to four hours. A combination with sodium benzoate increases its solubility and permits of quicker absorption.

Spartein acts more quickly than digitalis and its effects last from four to six hours. It can be used hypodermatically. It is useful in anasarca and aortic regurgitation given in doses of $^1/_8$ to $^1/_4$ gr.

Convallaria resembles digitalis in action but is less certain. It may be used as a substitute in 5 to 15 minim doses of the fluid

extract. Adonidin has a marked diuretic effect and acts more quickly than the other drugs in the list. It may be used hypodermatically and as thus administered Stern says it is nearly as rapid in action as glonoin, is sure to produce results, and does not have a cumulative effect. It may be safely given in fatty degeneration, compensatory conditions and not too well marked atheromatous conditions. There has been no lethal effect in any case. The dose ranges from $^1/_{30}$ gr. to $^1/_7$ gr. The action of the diffusible stimulants nitroglycerin and strychnin is too well known to require special mention.

Claims have been made for suprarenal extract as an excellent cardiac stimulant. It is said to increase the action when too slow and decrease it when too rapid and also steady the rhythm. The effect on the healthy heart is slight. It is worthy of trial when the well known drugs given above have proved inefficient. The dose is 5 gr. every three or four hours.

In cases of dilation following hypertrophy the method of administering digitalis or its substitutes is of considerable importance. It is well to prepare the way by giving several doses of calomel or blue mass to be followed in the morning by one-half ounce of sodium phosphate. This may be repeated every third or fourth day in smaller quantities. Full doses of the tincture or infusion of digitalis should be given every four hours for two or three days, accompanied by $^1/_{100}$ grain of nitroglycerin to prevent high arterial tension. Three to five drops each of the tinctures of nux vomica, digitalis and strophanthus may then be substituted.

To assist in stimulating the kidneys daily flushing of the bowels with several quarts of decinormal salt solution may be practiced. When compensation is reestablished the use of digitalis or its substitutes should at once cease.

When neither digitalis nor strophanthus agrees or if both fail to accomplish good results on account of cellular inactivity or inertia of the heart muscle, preparations similar to the following may be tried:

Caffein sodio-benzoate .....gr.	3—5
Strychnin sulphate .....gr.	$^1/_{30}$—$^1/_{20}$

Give every four hours.

is usually productive of good results. Salt sufficient to make a 1 or 2 per cent solution may be added to the water if desired.

Resisted Movements.—These consist of movements by the patient which are gently resisted by the operator. The movements are flexion, extension, abduction, adduction and rotation of the neck, limbs and trunk. The following rules are given by Schott:

1. Each movement is to be performed slowly and evenly, that is, at a uniform rate.

2. No movement is to be repeated twice in succession in the same limb or group of muscles.

3. Each single or combined movement is to be followed by an interval of rest.

4. The movements are not allowed to accelerate the patient's breathing, and the operator must watch the face for the slightest indication of (a) dilation of the alae nasi; (b) drawing of the corners of the mouth; (c) duskiness or pallor of the cheeks and lips; (d) yawning; (e) sweating; and (f) palpitation.

5. The appearance of any of these signs should be the signal for immediately interrupting the movements in process of execution, and for either supporting the limb which is being moved or to allow it to subside into a state of rest.

6. The patient must be directed to breathe regularly and uninterruptedly, and should he find any difficulty in doing so, or for some reason show a tendency to hold his breath, he must be instructed to continue counting in a whisper during the process of each movement.

7. No limb or portion of the patient's body is to be so constricted as to check the flow of blood.

The result of these exercises is to promote the circulation in the vessels and thereby lessen the work of the heart and allow its chambers to contract with less resistance. The movements may be given once daily at the outset and should not last over five to ten minutes, gradually lengthening the time to thirty minutes. The bath may be given in the morning and the exercise at night. If the baths are omitted the exercise may, after a few days' treatment, be given twice daily, but the second should not extend over 15 to 20 minutes.

In well developed cases of myocarditis or marked arteriosclerosis the exercises and baths are contraindicated.

The great value of the Schott treatment is now generally recognized. It sometimes produces marvelous results in restoring broken compensation when rest and cardiac tonics have failed.

Lung Inflation.—Abrams speaks in enthusiastic terms of the value of the pneumatic cabinet but admits that nearly as good results may be obtained by systematic breathing exercises. Deep inspiration followed by forcible expiration increases the amount of oxygen carried to the lungs and promotes the circulation from the right to the left heart.

The diet should receive the closest attention, especially in cases with urgent symptoms. In these the food must necessarily be liquid. Peptonized milk, broths, beef essences and egg-flips may be given. In the most desperate cases it may be necessary to resort to rectal feeding. Great care should be exercised in all cases to prevent the formation of gas in the stomach and intestines, which by pressing upward may interfere with the action of the heart. When the urgent symptoms disappear the patient may be allowed lightly boiled or poached eggs, peptonized preparations of farinaceous foods, bread and milk and other preparations easily digested, at different meals. If he is awake at night and hungry, milk and broths may be given.

Treatment of Special Symptoms. — *Palpitation.* — The treatment will have to be suited to the cause if it can be determined. If the stomach is overdistended with gas, tincture cardamom compound, ether, aromatic spirits of ammonia or spirits of peppermint may be sufficient relief. If the hypertrophy is great and there is a constant throbbing against the chest wall, with a strong pulse, the tincture of aconite in drop doses every hour or two will often afford relief. Sodium or potassium bromid in doses of 15 to 30 grains is efficacious in many cases. An ice-bag may be applied to the precordial region with good results.

Dyspnea and Orthopnea.—The remedies and means advocated under general treatment will usually afford relief. Occasionally dyspnea comes on in paroxysms when nitroglycerin or the amyl nitrate may be employed. Attacks of dyspnea not infrequently

occur at night. The patient may be obliged to sit up to breathe, at the same time suffering from palpitation. For this condition sodium bromid in combination with deodorized tincture of opium at bedtime is frequently beneficial. When that stage in the disease is reached, when there is little likelihood of restoring compensation, morphin may be given by the mouth or hypodermatically. There need be no fear of contracting the habit and it affords relief not to be obtained by any other drug.

Cough.—If cough is caused by pulmonary congestion due to failure of compensation, no special treatment is needed. If, however, it be due to bronchial catarrh the appropriate remedies for that condition may be administered. Ammonia is not only good for the cough but stimulating to the heart. Codein (grain $^1/_6$—$\frac{1}{4}$) or heroin (grain $^1/_{12}$) may be given.

Hemoptysis.—This usually requires no treatment and in fact may prove to be beneficial in relieving pulmonary congestion. In severe cases absolute rest in bed may be all that is necessary. Morphin combined with atropin injected subcutaneously is valuable. Nitroglycerin is also an excellent remedy. If these drugs prove inefficient the patient may take large quantities of gelatin.

Pain.—When it is of a neuralgic character the nitrites usually afford speedy relief. In case they fail recourse may be had to morphin and atropin. The application of a blister over the precordial area may give the needed relief. Carminatives and stimulants may also be required. The iodids might be of considerable value if well borne by the stomach.

Gastric Symptoms.—Catarrh may develop after the failure of compensation. Vomiting may arise from this or from the use of digitalis. It may be well to prohibit food for a day and then permit of only a light diet. Prepared foods consisting of the albuminized extracts of beef and grain may be useful in these cases, or a total milk diet. If digitalis does not agree, digitalin combined with strychnin or caffein sodo-benzoate may be given by hypodermic injection. Fermentation may be partly prevented by 10-grain doses of sodium benzoate, three times a day. The catarrhal condition may be helped by the use of two drams of sodium phosphate dissolved in hot water every morning.

Nervous Symptoms.—It may be necessary to use remedies

for restlessness and insomnia. For the latter condition 15 to 30 grains of sodium bromid or 15 to 30 grains of trional may produce good results. The remedies may be combined. For the nervousness and hallucinations, spirits of chloroform (15 minims), Hoffman's anodyne (1 dram) or ether (½-dram) may be found highly useful. When other remedies fail morphin may be called into requisition. For faintness the recumbent position, fresh air and the use of ether, alcohol, or ammonia is all the treatment necessary.

Dropsy.—As has been mentioned, the cardiac tonics produce diuresis and when acting favorably quickly relieve the patient of the serous exudate. In many cases, however, they are insufficient or can be greatly assisted in their task by purgatives and diuretics. Absolute rest alone may be sufficient to cause the dropsy to disappear. In a test with forty cases Maclaren demonstrated that in 60 per cent there was "spontaneous diuresis" without any further treatment than a placebo of tincture cardamom compound and rest in bed with proper diet. He states that polyuria often continues for several days after the disappearance of the anasarca.

If such results can be attained by rest alone, greater assurance of successful treatment may be felt when digitalis is given. Pure diuretics like diuretin and acetate of potassium may be combined with the infusion of digitalis with increased effect. A combination of the heart tonics will often act more positively than one alone.

Purgatives act more quickly than diuretics and are a very efficient aid. Epsom or Rochelle salts, the least irritating of salines, should be given in concentrated solution preferably in the morning when the stomach is empty. Calomel often acts well as a diuretic and should be given for several days, or when several doses are administered it may be followed by a saline. If given in the latter manner it should be repeated once in three or four days. Other drugs for purgation are elaterin ($^1/_{20}$ to $^1/_{12}$ grain), compound jalap powder (30 to 60 grains), podophyllin ($\frac{1}{3}$ to $\frac{1}{2}$ grain) and the compound extract of colocynth (3 to 6 grains).

Buttermilk or two to three quarts of skimmed milk daily may

increase the amount of urine. The use of this form of milk does not preclude the use of other food preparations.

If the above lines of treatment fail in reducing the dropsy it may be necessary to resort to paracentesis. The punctures should be made in the most dependent portions of the body (as the legs or abdomen) and should be made only under strict aseptic precautions. Incisions may be made with a scalpel on either side of the leg. If the thigh is greatly swollen or it is desirable to rapidly remove the fluid, the method used by Albert Abrams may give the best result. "Two incisions are made on either side of the thigh above the knee joint; then a Martin elastic bandage is applied at the foot and extended upward to an inch below the incision. The bandage forces the fluid toward the incisions." The incisions should be kept covered with borated cotton or gauze. If puncture is made to the abdominal wall it should be made in the middle line.

HEAT-STROKE; SUNSTROKE.

DEFINITION.—An acute affection due to exposure to excessive heat.

VARIETIES.—There are two varieties: (1) Sunstroke, or thermic fever; (2) heat-exhaustion.

ETIOLOGY.—The exciting cause is exposure to high atmospheric or artificial temperature, with much humidity—usually the direct rays of the sun on the hot days of summer. Stokers, glass-blowers, bakers, etc., often suffer from it. Predisposing causes are debility, fatigue, lack of drinking water, intemperance, excitement or previous attacks of sunstroke.

PATHOLOGY.—After death from heat-stroke rigor mortis comes on rapidly and putrefaction soon follows. The left ventricle is found to be firmly contracted and the right heart and vena cava dilated and filled with dark-colored and uncoagulated blood. In cases which recover there is more or less breaking-down of the red blood cells with subsequent anemia. Ecchymoses are found in the skin and serous membranes. The cerebral and spinal meninges are hyperemic and degenerative changes have taken place in the central nervous cells of the

cerebro-spinal system. Parenchymatous degeneration may sometimes be observed in the kidney and liver.

According to Lambert and Van Gieson (Medical News) these changes are due to an autotoxemia excited only by sunstroke.

SYMPTOMS.—*Thermic fever* is usually, but not always, preceded by prodromes coming on a few hours or in some cases several days before the attack. These symptoms include exhaustion, dizziness, suppression of sweating, restlessness, a sense of oppression in the chest, severe headache, nausea and sometimes vomiting. More or less complete insensibility follows, sometimes amounting to sudden and complete coma. The face is flushed; the skin is hot and dry; the pulse full and rapid and the carotids bounding; the respiration rapid and stertorous. If the patient is conscious he complains of intolerable throbbing headache and cramps in the stomach. The nausea and vomiting often continue and urination is frequent. The pupils are contracted. Delirium is common. The temperature is usually very high, reaching 105° to 115° F. As the disease progresses toward an unfavorable termination the pulse becomes more rapid and feeble, respiration is shallow and difficult and assumes the Cheyne-Stokes type, convulsions may occur, there is fecal and urinary incontinence, the pupils become widely dilated and death soon follows. There is leukocytosis.

Heat-exhaustion may be preceded by prodromes, including dizziness, faintness, drowsiness, headache, gastric pain or discomfort, and tingling of the extremities; or it may come on without premonitory symptoms. The symptoms are almost diametrically opposite to those of thermic fever. Except for temporary fainting, unconsciousness is rare, but the patient seems dazed and uncertain in his mental perceptions and knowledge of surrounding objects. The surface is cold; the skin moist and clammy; the pulse is small, rapid and feeble and respiration shallow. The temperature is at first subnormal, but later may be slightly elevated. Prostration is profound and the symptoms often indicate collapse. The patient usually recovers.

DIAGNOSIS is important. It is necessary to differentiate between the two forms of the disease, since the methods to be used in their treatment are essentially different.

In *acute alcoholism* there is the smell of spirits, the tempera-

ture is nearly always normal and the patient may usually be roused. The mere smell of alcohol should not lead one to a hasty diagnosis.

In *apoplexy* there are paralyses; stertor and coma are very marked; the rise of temperature is very slight and not alike on both sides.

In *uremia* there is albuminous or suppressed urine, temperature nearly normal and the odor of urine on the breath.

PROGNOSIS.—In thermic fever the danger is great. According to Anders the mortality ranges from 15 to 50 per cent. Death may sometimes occur within half an hour. In heat exhaustion prognosis is good. Recovery is the rule, although deaths sometimes occur. Sunstroke, unfortunately, tends to leave behind serious sequelae. Among these are sensitiveness to heat, headaches, irritability, failure of mental power, forgetfulness and sometimes insanity.

TREATMENT.—*Prophylaxis.*—The constant danger of heatstroke during the summer months should be impressed upon the minds of those inclined to excesses in eating and drinking and a light but nutritious diet, abstinence from alcohol, avoidance of fatigue and careful ventilation of living and working rooms advised. The function of the sweat glands should be watched and encouraged by demulcent drinks and frequent bathing. Clothing should not be unnecessarily heavy; the hat especially should be light and well ventilated. Checking of the perspiration, dizziness, faintness, headache and nausea should be signals for the immediate abandonment of work and the individual should seek rest in the shade.

In *thermic fever* the excessive temperature must be reduced at once. This is most quickly and safely accomplished by the use of cold. If the temperature is high the patient should be immersed in a tub of ice water (at about 60° F.), all the time being vigorously rubbed; or the surface of the body may be rubbed with pieces of ice. Thompson recommends sprinkling him with ice water from an ordinary garden watering pot at an elevation of three or four feet, while Anders finds that the cold needle spray is an excellent nervous stimulant as well as antipyretic. As an adjuvant to these measures ice water enemata may be used. Ice bags or cold effusions should be applied

to the head and back of the neck. The effect upon the temperature should be watched and when it reaches 102° F., taken by the rectum, the patient should be rubbed dry, placed in bed, lightly covered, with ice to the head, and surrounded with hot water bottles if there is evidence of collapse. Subsequent rise of temperature may usually be controlled by cold sponging or by the cold pack. The ice-cap should be kept on the head during hyperpyrexia. When the temperature does not exceed 105° F. these last named measures will suffice to reduce it. In many cases the vigorous hydrotherapeutic measures recommended will be followed by reduction of temperature to subnormal. Such cases should be watched and proper stimulants administered to prevent collapse.

In robust, plethoric patients, with full, bounding pulse, pulsating carotids and muscular twitching, venesection will be found useful. To quiet delirium and restlessness a full dose of morphin should be given hypodermically and repeated as necessary.

Convulsions require inhalation of chloroform. If symptoms of collapse arise, in addition to hot applications to the extremities a mustard draft may be applied to the epigastrium and digitalis, strychnin, nitroglycerin, atropin, whiskey, or camphor given hypodermically, according to the necessities of the case. The coal-tar antipyretics should be avoided, but quinin sulphate may be administered by the mouth if the patient can swallow. Artificial respiration may be tried in desperate cases.

During convalescence the patient should be placed upon a light liquid diet, the bowels opened by calomel and the functions of the kidneys and skin maintained by suitable remedies. The anemia which follows is benefited by iron, manganese and arsenic, and quinin and strychnin may be given in small doses for their tonic effect.

In *heat exhaustion* the patient is placed in a cool place, the clothing loosened, the head lowered, the face lightly sprinkled with cool water and stimulants administered, such as inhalations of ammonia, camphor or amyl nitrite, a little brandy, whiskey or aromatic spirits of ammonia by the mouth, or digitalis, nitroglcerin, strychnin, brandy or camphorated oil hypodermically. In severe cases heat to the extremities or a hot bath may be required.

HEMOPHILIA.

DEFINITION.—A condition of the blood characterized by decreased coagulability and abnormal tendency to hemorrhage. Sufferers from this condition are often called "bleeders."

ETIOLOGY.—It is usually hereditary, and appears in most cases in early life, often at about the time of cutting the permanent teeth. It very rarely occurs in females.

PATHOLOGY.—The exact nature of the condition is unknown, but there is delayed coagulation of blood. According to Henry it is due rather to defects in the vessels than to any condition of the blood.

SYMPTOMS.—The hemorrhages may follow slight traumatisms, as scratches or cuts; very frequently they are excited by the extraction of a tooth. Or bleeding may appear spontaneously, especially from mucous surfaces; nosebleed is the most common example. In these cases there is an oozing from the capillaries, moderate in amount, but sometimes continuing for days—until the patient is nearly exsanguinated. Bleeding may occur from the mouth, stomach, lungs, kidneys, bladder and urethra. Petechiae may form beneath the skin or extensive extravasations follow bruises. Hemorrhages into the joints are not infrequent and may cause symptoms resembling rheumatism.

PROGNOSIS.—Not unfavorable in most cases. In severe cases or appearing early in life it is grave. As the patient advances in years the tendency is toward recovery.

TREATMENT.—*Prophylaxis.*—All unnecessary surgical operations should be avoided when possible, such as lancing the gums, the extraction of teeth and vaccination, and the patient should be advised of the danger of irritation of the nose, by picking or violent blowing, and of cuts, bruises and the like.

Medicinal.—Styptic applications and pressure should be made to the bleeding point if it is accessible. A cavity left by an extracted tooth may be filled with a pledget of cotton-wool soaked in Monsel's solution and the jaws firmly bandaged together so as to hold it in place; or tannin, alum or turpentine may be similarly applied. Similar applications are used in nosebleed and it may be necessary to plug the nostril (see Epistaxis). Topical applications of gelatin solutions have also been

successfully used. Internally gallic acid (3 to 5 grains), lead acetate (2 to 3 grains), turpentine (10 to 20 drops in emulsion), tincture of iron (½ dram every two hours) and hydrastis (20 to 40 drops daily) are used with benefit. Calcium chlorid (5 to 20 grains three or four times daily) has given excellent results in the hands of a number of observers. Oxygen inhalations, bone-marrow and thyroid extract have recently been recommended. To increase the number of leukocytes nuclein or pilocarpin may be tried. Opium is of unquestionable value for its sedative effect; morphin may be given hypodermically, or the drug may be combined with the styptics and given internally.

HEMOPTYSIS; BRONCHIAL HEMORRHAGE.

ETIOLOGY.—Hemoptysis may be caused by traumatism, vicarious menstruation, venous stasis due to heart or liver disease, the rupture of an aneurism, hemophilia, scurvy, purpura, anemia, arteriosclerosis, or malignant disease of the lung. It is a symptom of pneumonia and occasionally of other acute respiratory diseases. Its special significance, however, is as a symptom of pulmonary tuberculosis. Gabrilowitsch found that 213 out of 380 cases of phthisis which he studied had hemorrhages.

SYMPTOMS.—Hemorrhage from the broncho-pulmonary tract is preceded by or associated with a sense of heaviness in the chest, cough, tenderness under the sternum, and a warm salty taste. The blood is *coughed up*, is bright red in color, frothy and alkaline in reaction. The quantity varies greatly; only a dram or two may be expectorated or the mouth may be flooded with blood. The hemorrhage is likely to excite a good deal of mental agitation, producing restlessness and cardiac palpitation. If a large amount of blood is raised there are evidences of shock, as pallor of the skin (produced largely by the symptomatic anemia), coldness of the extremities, clammy sweat, dizziness, fainting and a rapid, weak pulse. The small hemorrhages are caused by capillary oozing; the largest are produced by bursting of an aneurism or erosion of an artery. Sometimes the blood may be swallowed and consequently vomited, when

it will be darker in color and alkaline, or it may pass from the stomach into the intestines and appear as a tarry mass in the stools. The hemorrhage may last only a few minutes or may continue for several days. The sputa is stained with blood for some time after the active hemorrhage ceases. In phthisis, hemorrhages are likely to recur from time to time.

Upon auscultation, mucous, bronchial rales may usually be heard. Percussion should not be practiced.

DIAGNOSIS.—Pulmonary hemorrhage must be differentiated from vomiting of blood. The following table will be of assistance:

HEMOPTYSIS.	HEMATEMESIS.
Usually history of pulmonary disorder; sometimes cardiac, hepatic or blood disease.	History of disease of abdominal organs.
Hemorrhage preceded by thoracic oppression and salty taste.	Hemorrhage preceded by gastric distress or nausea.
Blood ejected by coughing.	Blood ejected by vomiting.
Blood bright red, frothy, uncoagulated and mixed with sputum.	Blood dark red, often blackish, partially coagulated and mixed with food.
Sputum stained with blood for some time after hemorrhage.	No staining of sputum.
No blood in the stools, in most cases.	Stools contain blood, making tarry-colored feces.
Auscultation reveals rales.	Auscultation negative.

PROGNOSIS.—Hemoptysis is seldom in itself the cause of death. It should be remembered that it is generally the symptom, and often the first symptom, of pulmonary tuberculosis, a disease whose prognosis is always grave. Very large hemorrhages produced by rupture of an aneurism or bleeding from a large artery may be almost immediately fatal.

TREATMENT.—Mild hemorrhages from the pulmonary tract require little treatment except rest and avoidance of excitement. In more severe cases the patient should be put to bed with head and shoulders elevated and perfect quiet enjoined; he should not be allowed to move except as absolutely necessary. A bed-pan should be provided for the evacuation of the

bowels and the bladder. Talking should be forbidden. Above all, no appearance of alarm or excitement should be permitted within sight and sound of the sufferer. The attendants should be cheerful, attentive and reassuring in manner and speech in order to quiet the fears of impending death which the patient often entertains. To relieve the thirst he may be allowed to chew cracked ice or take small sips of ice water as often as desired. Alcoholic or hot drinks are not permissible unless demanded by collapse.

The first indication to be met is the tumultuous action of the heart and the increased vascular tension in the lung. For this an ice-bag should be placed over the cardiac region and aconite administered internally if the pulse is full and bounding. Measures which confine the blood to the systemic circulation are useful, such as heat to the extremities or hot-water enemas given at a temperature of 122° F. (Tripier). Foxwell recommends the use of the nitrites, as nitroglycerin or amyl nitrite, for this purpose, and increases the fullness of the vessels supplying the digestive tract by giving nutritious food. Ligatures around the arms and legs prevent the return of venous blood to the pulmonary circulation; they must not be too long continued. Depletion may be obtained in vigorous patients by the administration of salines. Venesection is still recommended in the text-books, but seldom practiced.

Cough favors hemorrhage. Morphin is the best remedy and should be given hypodermically. It also quiets the patient and equalizes the circulation. While morphin slightly stimulates the heart, by diminishing excitability it has a markedly cardiac sedative effect in hemoptysis. Probably no single drug is of so great value in this condition; it should be given early and repeated as needed. Opium may be given by the mouth and combined with aconite if it is necessary to still further reduce the vascular excitation. Danforth gives ten drops of deodorized tincture of opium and two drops of tincture of aconite every two hours until the pulse drops to 60. Or the powdered opium or Dover's powder may be given with gallic acid, lead acetate or other styptics as hereafter described. Nervous excitement may require the bromids or chloral, as in the following:

Potassium bromid .....dr. 4
Deod. tinct. opium.....dr. 3
Syrup orange .....oz. 2
Simple elixir, enough to make.....oz. 4
Dessertspoonful every three hours.

To check the hemorrhage various styptics have been used. Ergot is now believed to be positively injurious, since while it constricts the vessels it also raises arterial tension. Gallic acid and lead acetate are the favorite remedies. They may be given in two to five grain doses, combined with opium. They are more valuable in cases which tend to prolongation and are attended by persistent capillary oozing. The following are sample prescriptions:

Gallic acid .....gr. 36—60
Dover's powder .....gr. 36
Make 12 capsules. One every three hours.

Or—

Gallic acid .....dr. 2
Arom. sulphuric acid.....dr. 1
Morphin sulph. .....gr. 1
Comp. tinct. cardamom .....oz. 1
Rose water .....oz. 2
One teaspoonful in water every hour or two.—Shoemaker.

Or—

Lead acetate .....gr. 24
Powd. opium .....gr. 6
Make 12 capsules. One every one to three hours.

Calcium chlorid has been recommended of late to increase the coagulability of the blood. The dose is 5 to 20 grains three or four times daily. It may be given in capsules.

In thoracic aneurism or arterial hemorrhage the danger is great. The patient should be placed in the horizontal position and not allowed to move. Opium is contraindicated but the measures for arterial sedation including venesection may be tried. Atropin sulphate ($^1/_{50}$ to $^1/_{25}$ grain) hypodermically is given by Babcock. It was first recommended by Traube.

Subsequent treatment includes bland unstimulating food, avoidance of alcohol and tobacco and prohibition of physical or mental strain. The health should be kept at the best standard possible by nutritious food, outdoor air and gentle exercise.

Murphy's intraplural injections of nitrogen gas undoubtedly serve to prevent in a large degree the recurrence of hemorrhage. Denison of Denver has devised a method of strapping the

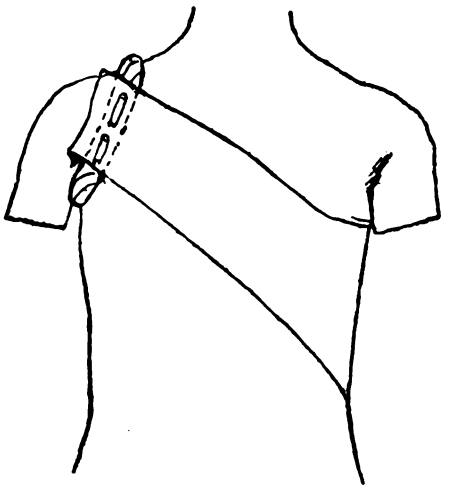


FIG. 8. DR. DENISON'S TRACTION PLASTER.

affected side of the chest in such a way as to completely limit its motion, without interfering with the function of the opposite side of the chest. It proves of the utmost value in these hemorrhages.

HEMORRHOIDS; "PILES."

DEFINITION.—Strictly speaking a hemorrhoid is a mass of dilated or varicose veins lying just within or just without the anal sphincter. This definition does not exactly describe the external cutaneous "pile," which is merely a tag of inflamed skin.

VARIETIES.—(1) External, including (a) cutaneous and (b) thrombotic hemorrhoids; (2) internal.

ETIOLOGY.—Hemorrhoids may be caused by anything which produces an obstruction to the portal circulation, since this system collects a large portion of the blood coming from the hemorrhoidal veins. Piles are therefore likely to complicate

impair respiration and disease of the heart. Alcoholic drinks *probably predispose to piles on account of their tendency to produce disease or disorder of the liver.* Engorgement and *consequent varicosity of the veins may be due to anal pressure, irritation or inflammation.* The most common exciting cause *is constipation; others are straining at stool, diarrhea and dysentery, pregnancy, pelvic tumors, uterine enlargement and displacements.*

External piles may be excited by the passage of hardened feces, irritant matter from the bowel or vagina, rough toilet paper or lack of cleanliness.

PATHOLOGY.—A cutaneous pile is merely a tag of skin which has become inflamed. The thrombotic (external) pile lies just at the anal margin and is covered by both skin and mucous membrane. It is a small tumor, filled with a blood clot, probably from rupture of a small vein while straining at stool. External piles lie wholly without the sphincter ani.

Internal piles are situated within the sphincter, but upon straining the tumor is generally extruded and has to be replaced after defecation. It is a well-defined tumor, single or lobulated, sessile or pedunculated and dark red or purple in color. Its base is usually elongated, corresponding with the axis of the bowel. It frequently becomes eroded or ulcerated and may be partially strangulated by the sphincter. Internally it is found to consist of a mass of dilated veins, filled with blood, and connected by areolar tissue. There is an overgrowth of all the tissue elements entering into its make-up.

SYMPTOMS.—A cutaneous pile causes little discomfort until it becomes inflamed. It is then reddened, swollen, hard and excessively tender and painful. The pain of the thrombotic variety is also proportionate to the amount of inflammation. It is usually severe but the pile is itself less irritable than the cutaneous variety.

The symptoms produced by internal piles depend upon their size, whether they are protruded or not, and the presence or absence of erosion or ulceration. The mass may make a formidable tumor which comes down with slight straining or a sessile tumor which never protrudes. There is a sense of fulness and heat in the rectum, frequent desire for stool and

sometimes actual pain, dull and aching in character. If the pile becomes inflamed, as occasionally happens, these symptoms are much intensified.

Hemorrhage is a frequent symptom of internal piles, hence they are often called "bleeding piles." The loss of blood is usually slight, but may be very great and produce serious prostration. Ulceration may cause free discharge of pus and mucus and sometimes as a result of strangulation the mass becomes gangrenous.

PROGNOSIS.—Good as regards life, though the excessive hemorrhage has been known to cause death. A true hemorrhoid is probably never cured except by surgical measures, and the tendency is for it to increase in size.

TREATMENT.—The best treatment for an external pile of either variety is to remove it. This is easily done, and by the hypodermic injection of a little cocain or Schleich mixture, may be made quite painless. The cutaneous tag is gently pulled out and snipped off at its base and the venous pile is split open, its contents shelled out, its interior cauterized with pure carbolic acid and a simple antiseptic dressing applied. For this purpose Roberts prefers this ointment:

Carbolic acid	gr. 20
Zinc ointment	oz. 1

But the patient will not always consent to this procedure, simple as it may seem. In such a case palliative treatment must be resorted to. Hot or cold compresses, according to the patient's preferences, serve to reduce the inflammation better than most drugs. Equal parts of extract belladonna and glycerin make a soothing application, or the parts may be bathed with distilled extract of witch hazel or lead and opium wash.

Ointments serve a good purpose. Vaselin alone or carbolized or one of the following is worthy of trial in severe cases. Monroe recommends:

Powdered opium	dr. ½
Tannin	dr. 2
Bismuth subnitrate	dr. 2
Borated lard	oz. 2

This is spread upon thick cloth or lint, applied to the anus and held in place with a T bandage.

Other ointments which alleviate the symptoms, especially the itching, which is a disagreeable symptom, are the following:

Calomel .....gr. 40
Chloral hydrate .....gr. 20
Vaselin .....oz. 1

Or—

Ext. belladonna .....gr. $^{10}/_{20}$
Menthol .....gr. $^{10}/_{20}$
Petrolatum .....oz. 1

—Bass in Charlotte Medical Journal.

Internal piles are much more serious than the external, but the palliative treatment is much the same. If they are down and inflamed it is best to commence treatment with the hot or cold applications, at the same time unloading the bowels with salines, preceded, if the liver is inactive, by a few small doses of calomel. If the part is very painful and tender it is necessary to put the patient to bed and apply hot linseed poultices. As an anodyne and antiseptic application, Bass recommends the following:

Menthol .....dr. 1
Acid carbolic .....dr. 1
Powd. zinc oxid.....dr. 2
Simple cerate.....oz. 2
Oil sweet almonds.....oz. 1

This is applied morning, noon and night with a pile pipe, and oftener if the bowels should move.

If the piles are inflamed and difficult of reduction Mathews uses:

Cocain hydrochlor .....gr. 12
Iodoform .....dr. 1
Ext. opium .....gr. 30
Petrolatum .....oz. 1

Before returning an extruded pile it should always be gently bathed in cold water and anointed with vaselin or olive oil. It may then be gently pushed within the sphincter.

Various astringent, anodyne and antiseptic suppositories are used in the treatment of internal hemorrhoids. They are usually merely palliative—rarely they may prove actually curative. Below are formulas:

J. R. Anderson (Medical Summary) recommends:

Hydrastin .....gr. 10
Powd. alum .....gr. 10
Cocain hydrochlor.....gr. 6
Cacao butter, a sufficient quantity.
Make 12 suppositories. One at bedtime or night and morning.

Ointment galls.....oz. 1
Ointment stramonium.....oz. 1
Apply to anus and push up into rectum.—Roberts.

The following is used by Hare:

Gallic acid .....gr. 20
Ext. opium .....gr. 1
Ext. belladonna .....gr. 2
Cacao butter, a sufficient quantity.
Make 10 suppositories. Use at night.

Chrysarobin 8
Iodoform 3
Ext. belladonna 6
Vaselin 15.0
Apply twice daily.

The above is recommended by Boas. If hemorrhages occur he recommends the internal use of fluid extract of hamamelis, virg., teaspoonful three times a day. Bartholow gives a teaspoonful of the following every four hours:

Fluid ext. ergot.....dr. 3
Tinct. digitalis.....dr. 1

If the hemorrhage is severe the rectum may be tamponed with ferripyrin, chlorid of iron or iodoform gauze or the bleeding spot touched with nitrate of silver.

Constipation being the most common cause of hemorrhoids, regulation of the bowels is important. Careful attention to diet, proper exercise and massage may do this, or cold water enemas may be used. The laxatives recommended are compound licorice powder, cascara sagrada, calomel, if the liver is sluggish, and the aperient mineral waters if the patient is plethoric.

Of course, operative treatment offers the best hope of cure. In some cases the ligature, cautery and knife are undoubtedly best. The injection treatment has its advocates. Carbolic acid is the favorite for this purpose, usually used in 10 to 30 per cent solution. The general directions for all solutions are: First carefully cleanse the tumor; smear muco-cutaneous surface with vaselin; insert needle midway between base and apex

and pass it to the center of the pile; inject slowly, drop by drop, until surface is blanched. Below are given formulas:

Carbolic acid (Calvert's) sat. sol.....dr. 1
Olive oil .....dr. 2

Inject 5 to 10 drops.—Monroe.

Carbolic acid .....dr. 1½
Salicylic acid .....dr. 1½
Borax .....dr. 1
Glycerin .....oz. 1

Inject 2 to 4 minims.—Tuttle.

Agnew's formula is:

No. 1.

Lead acetate .....dr. 2
Borax .....dr. 2
Glycerin .....oz. 1

Mix with heat. Let stand 24 hours.

No. 2.

Carbolic acid (cryst.).....oz. 1
Distilled water .....dr. 2
Sol. No. 1.....dr. 6

Solution for hemorrhoids. Use as already directed.

HERPES; FEVER-BLISTERS; COLD SORES.

DEFINITION.—An acute inflammatory disease of the skin characterized by the eruption of a cluster of small vesicles upon an inflamed base.

VARIETIES.—(1) Herpes facialis; (2) Herpes genitalis.

ETIOLOGY.—It is supposed to be due to a mild peripheral neuritis. Exciting causes are exposure to cold, coryza, bronchitis, tonsillitis, pneumonia, typhoid fever, malaria, disturbances of the digestive tract, especially in children, and a neurotic or uric acid diathesis. A long prepuce, irritating discharges, uncleanliness, irritation of the genitals, menstruation and sexual excitement, are predisposing causes of herpes genitalis. The latter variety is common in prostitutes.

SYMPTOMS.—"Cold sores" require no description. They usually occur at the border of the lips and corners of the mouth, but may attack any portion of the face or the mucous membrane of the mouth and throat. A cluster of vesicles appears upon an inflamed base, attended by redness, swelling and a sense of tingling and burning. These vesicles finally run

together and form a bleb which dries up, leaving a brownish scab that is thrown off within a few days.

Herpes of the genitals resembles that of the face, but there is usually but a single group. It occurs both in men and women. The sites of preference are the inner surface and margin of the prepuce and the glans in men, and the skin of the vulva, labia majora and minora, clitoris and urethral orifice in women. The lesion goes through the process of vesiculation, ending in a scab which falls in a week or two. Itching is likely to be severe, especially in women, and the vesicles may be torn and crusts form on account of the scratching. Sometimes there is neuralgic pain, similar to that of herpes zoster.

DIAGNOSIS.—No difficulty attends the diagnosis of herpes facialis. The possibility that an erosion of the genitals may be a venereal sore must always be kept in mind. The following table will be found helpful:

HERPES GENITALIS.	CHANCROID.	CHANCRE.
Excited by irritation, as by coitus and unclean discharges; no distinct period of incubation.	Excited by contact with venereal sore; follows coitus within two or three days.	Due to syphilitic inoculation; follows coitus; incubation period averages about three weeks.
Lesions are multiple; often confluent; no autoinfection.	Lesions often multiple; tends to infect adjacent surfaces.	Usually single; no autoinfection.
Begins as a group of vesicles.	Begins as pustule or ulcer.	Usually begins as erosion, papule or ulcer.
Superficial; irregular circular outline; bright red granulating surface; sometimes covered with scab; scanty serous secretion.	Excavated; usually round or oval; surface rough and uneven and covered with purulent slough.	Superficial, cup-shaped, or elevated; surface smooth, glazed and dusky red; scanty serous secretion.
No induration.	No induration; boggy, inelastic and shading into surrounding tissue.	Induration; cartilaginous and parchment-like; easily movable and distinct.
Often painful.	Often very painful.	Seldom painful.
Bubo rare.	Bubo common; large, painful and usually one-sided.	Bubo constant; small, multiple and painless.

PROGNOSIS.—Favorable, but attacks are likely to recur from time to time.

TREATMENT.—In *herpes facialis* all irritation of the lesion should be avoided and the patient should especially be warned against scratching or biting the affected area. Mild sedative applications are to be used. If there is much itching or burning cooling lotions may be applied, such as camphor water, lead water and laudanum or boric acid solution.

Tilbury Fox recommended:

Zinc oxid	dr. 2
Glycerin	dr. 2
Dil. sol. lead subacetate	dr. 1½
Lime water	oz. 6 to 8

Another good formula is:

Camphor	gr. 5
Powdered arrowroot	gr. 30
Bismuth subnitrate	gr. 30
Rose water	dr. 1

Or a simple dusting powder be used, as stearate of zinc, or starch, talc, boric acid, and acetanilid variously combined, as in the following:

Borid acid	dr. ½
Acetanilid	dr. ½
Starch	oz. 1

The ointments used include camphorated cold cream, carbolated or camphorated vaselin, zinc ointment, etc. The following is good:

Tinct. benzoin comp	dr. 2
Balsam Peru	dr. 1
Cold cream, enough to make	oz. 1

Apply several times a day.

Lassar's paste makes an excellent protective; its formula is:

Zinc oxid	dr. 2
Starch	dr. 2
Vaselin	dr. 4

Flexible collodion, painted on with a camel's hair brush, protects the part and relieves the symptoms. It is of special value in young children.

Cleanliness is of great importance in *genital herpes.* The parts should be bathed in warm boric acid, carbolic acid or creolin solution, carefully dried and protected from irritation

or friction. An application of silver nitrate solution (10 grains to the ounce) may follow. Antiseptic, astringent and antipruritic lotions, such as black wash (lotio nigra), spirits of camphor and lead acetate solution are applied, or following the silver nitrate such powders as talc, bismuth subnitrate, europhen, aristol or calomel. Carstens recommends an ointment containing:

Tannic acid	gr. 20
Cold cream	oz. 1

Another good formula is:

Mercury bichlorid	gr. 1
Alcohol	dr. 2½
Ether	oz. 1
Pyroxylin	gr. 18

Apply to each herpetic spot once daily with camel's hair brush.

In the neuralgic form the following ointment will give relief (Medical World):

Cocain hydrochlorate	gr. 12
Menthol	gr. 1
Lanolin	dr. 4

To prevent the recurrence of attacks of simple herpes, arsenic internally, given for a considerable time, is advised. Strychnin and other nervous tonics should be used if needed. Sometimes circumcision will be found effective in preventing the return of the disease. Perfect cleanliness and sedative lotions or dusting powders after coitus should be advised.

HERPES ZOSTER; SHINGLES.

DEFINITION.—An acute inflammatory disease of the skin characterized by severe neuralgic pains and an eruption of vesicles upon the area supplied by a certain cutaneous nerve.

ETIOLOGY AND PATHOLOGY.—The exciting causes are atmospheric changes, exposure to cold, sudden chilling of the surface; injuries to the nerves caused by blows, punctured wounds or surgical operations; mental exhaustion, overwork, worry; the internal administration of arsenic. Cases of apparent infection have occurred. Kaposi and others believe it due to a specific micro-organism.

The disease is an inflammation of the nervous structures—

usually either a neuritis or perineuritis of the affected nerve. The inflammation of the nerve may arise at any point in its course from the spinal cord or brain to its distribution. The spinal ganglia are primarily affected in most cases and the inflammation descends from this point.

SYMPTOMS.—The eruption is usually preceded by *pain* in the part subsequently to be attacked, although it may be quite remote. It comes on generally a few hours, sometimes a number of days, before the appearance of the eruption, and is usually sharp and lancinating; less often it is dull and boring. The pain, as a rule, lasts throughout the attack and may persist after all visible signs of the disease have disappeared.

The eruption consists first of a small macular spot of inflamed skin, bright red, elevated above the surrounding surface and extremely sensitive to pressure. These spots are multiple, six to ten in number, and appear in the area supplied by the affected nerve. In a few hours vesicles appear in groups of three or four to twenty or more upon these inflamed patches. They are oval, elevated above the reddened base, pea-sized or larger and cause some heat or burning. They are not easily ruptured and contain a clear fluid which later becomes cloudy and sometimes hemorrhagic or pustular. In the course of one to two weeks the vesicles usually dry up, leaving brownish scabs. These shortly fall off and leave behind an unscarred surface.

The disease usually occurs upon the trunk, along the lines of the intercostal and lumbar nerves, but it may attack the face, scalp or any other portion of the body. The eruption is usually unilateral, but in very rare instances may complete the zone around the body. No special fatality attends this form as formerly believed. The constitutional disturbances of herpes zoster are usually slight. There may be some rise of temperature in severe cases.

Falling of the hair and loss of teeth sometimes follow the disease when it occurs upon the head. Paralysis and muscular atrophy may also be produced. In the region of the eye a destructive inflammation may be produced, causing blindness.

PROGNOSIS.—Complete recovery within a month is the rule, but in rare instances the disease may leave the patient with severe neuralgic pains which may persist for years and perma-

nently shatter the health. Blindness in one eye, as stated, is occasionally a result of the disease. The disease is rarely fatal.

TREATMENT.—Herpes zoster is a self-limited disease and not much influenced by treatment. Internal medication aims mainly to relieve the symptoms. Morphin or opium is often required for the relief of pain. Other drugs which are used for this purpose are antipyrin, phenacetin and acetanilid. Sodium salicylate and salicin are useful if there is a rheumatic diathesis. Zinc phosphid ($\frac{1}{4}$ to $\frac{1}{3}$ grain every three hours) alone or combined with strychnin or nux vomica is believed by some authors to have a peculiarly salutary effect. Quinin is also a favorite drug.

The vesicles should not be broken, since this increases the pain and the probability of ulceration and the formation of scars. The part should therefore be protected from the friction of clothing and picking and scratching should be forbidden. The skin should be protected from the air. Dusting powders as stearate of zinc, talc, lycopodium, starch, etc., are satisfactory local applications. The following is from Gould's Cyclopedia:

Morphin sulphate .....gr. 5
Powdered camphor .....gr. 20
Powdered zinc oxid.....oz. 1

Dust on the affected area. Cover with cotton and bandage.

The usual sedative lotions, as black wash, lead and opium wash, solutions of boric and carbolic acid, etc., may also be tried.

In severe cases great relief is sometimes obtained by painting the surface with flexible collodion. Cantrell recommends:

Salol .....dr. 1½
Ether .....oz. 1

Paint upon surface several times daily.

Ointments and pastes are also used; opium or belladonna may be combined with them. Lassar's paste is one of the best for this purpose. Cantrell recommends the following:

Bismuth subnitrate .....dr. 1
Petrolatum .....dr. 7

And—

Morphin .....gr. 1—2
Lanolin .....oz. 1

Care is necessary in the use of ointments since they favor the rupture of vesicles.

HIVES—See Urticaria.

HODGKIN'S DISEASE—See Lymphadenoma.

HYSTERIA.

DEFINITION.—A disordered condition of the nervous system in which there occurs a series of symptoms differing greatly in different patients, often emotional in type and characteristic of disturbance of nervous function and weakness of the controlling power of the will. Organic lesions are absent.

ETIOLOGY.—Heredity is an important factor. In most cases a history of nervous disease of some kind in other members of the patient's family may be elicited. It is much more common in females. It is most frequent between puberty and the thirtieth year; it is seldom seen after the menopause. Improper education and failure to develop the will power are predisposing factors. Children that are petted, humored and allowed to develop willful tendencies are most likely to develop hysteria. Debility from overwork, worry, nervous strain, sexual excesses (it is common in prostitutes), unhygienic surroundings, uterine and ovarian disease and alcoholism, morphin, cocain and other drug habits predispose to the disease. In many instances it has been shown to be contagious. Epidemics of hysteria were common in the middle ages and are still seen at religious and other emotional gatherings, as shown by hysterical laughter, crying, dancing, etc.

Exciting causes are mental strain or shock as from the death of a friend, disappointment in love, pecuniary losses, the sight of an accident, fear, shame and other profound emotions. Hysteria may occur in the course of acute diseases or as a complication of chronic ones, even those of the nervous system, such as epilepsy or tabes. In the latter cases its diagnosis is extremely difficult. Trauma is an exciting cause and cases ascribed to this are extremely intractable—often incurable. The injury may be slight and the symptoms may arise some time after its reception. "Railroad spine" is often of this class.

SYMPTOMS.—There is no uniform course in hysteria. The patient may present almost any of the symptoms which occur in other forms of nervous disease. There are, however, certain

characteristic features which serve to distinguish it from the condition which it simulates. Persons subject to hysteria are not necessarily debilitated; they may be in excellent physical health. In temper they are fitful, exaggerating every ailment, hypersensitive to criticism, demanding constant attention or sympathy, petulant, irritable or morose. At other times they may be bright, witty and entertaining.

The symptoms of hysteria may be divided into two main classes—(1) the latent stage or stage of stigmata; (2) the convulsive stage.

1. Latent Stage, or Stage of Stigmata.—In this stage, among the multitude of symptoms found in different cases, there are certain characteristic features called by Charcot "hysterical stigmata," including sensory, motor, secretory, visceral and psychic disturbances.

Sensory Disturbances.—Anesthesia is present in greater or less degree in many cases. This may affect one-half the body, an extremity, or be confined to definite circumscribed spots. Sometimes there is complete analgesia or absence of the sensation of pain and pins may be driven into the flesh or the conjunctiva may be touched with an irritant without exciting response. The mucous surfaces, muscles, joints and deeper tissues may likewise be affected. Anesthesia to the sensation of heat, more rarely to electricity, may occur.

Hyperesthesia of the skin or mucosa is one of the most common of hysterical stigmata. Crawling sensations are sometimes felt and excessive tenderness or pain upon pressure over certain spots, called "hysterogenetic zones," are usually present. These zones are found in all portions of the body, but especially in the region of the ovaries. The surface over the heart, kidneys or other viscera may be hypersensitive and painful, in which case the patient is likely to imagine that there is disease of the underlying organs. "Spinal irritability" is a well-known example of hysterical hyperesthesia. Peculiar forms are *clavus hystericus,* a localized pain in the head described as giving the sensation of a nail being driven into the skull, and *globus hystericus,* the feeling that a ball is in the throat. The breasts (irritable breasts), the stomach, the joints and viscera may be affected.

The disturbances of the *special senses* occurring in hysteria are due to sensory causes. Anesthesia of the retina may cause dimness of vision, color-blindness or even hysterical blindness. Loss of hearing, smell and taste are not infrequent. On the other hand these may be increased sensitiveness and exaltation of all the special senses.

Motor Disturbances.—First is ***paralysis.*** This usually comes on suddenly, sometimes gradually. As in other hysterical symptoms it is apparent rather than real. The patient may be able to move his limbs while in bed but unable to use them in efforts at voluntary motion. Tyson calls it a "paralysis of the will." One side of the body is most frequently affected: very rarely both sides. The legs are most likely to be paralyzed: the face never is. According to Weir Mitchell the left side suffers four times as often as the right. In walking the leg is dragged instead of being swung outward as in true hemiplegia. Paralysis of the vocal cords may cause complete aphonia or loss of voice. Prolonged paralysis may produce wasting of the muscles.

Contractures of the muscles are quite common and often persistent. They usually appear suddenly, affecting most frequently the flexor muscles of the toes and fingers. Other joints may be involved or they may occur in the face or neck. *Phantom tumor* is due to hysterical contracture of the abdominal muscles. These contractures disappear under a general anesthetic. Marked emaciation may occur in connection with them. The reflexes are usually exaggerated.

Hysteric ataxia or astasia-abasia is another motor symptom, in which there is inability to stand or walk. Hysterical tremors, and various rotary or nodding or choreiform movements also occur.

Secretory disturbances include an increased or diminished quantity of perspiration or of the salivary secretion. The passage of large quantities of pale urine is a frequent hysterical stigma: it is especially likely to follow a convulsive seizure. Anuria is very rare.

Visceral Disturbances.—The heart's action may be slow or rapid, bradycardia or tachycardia, and there may be hysterical dyspnea, a sense of suffocation and irregularity of respiration.

Pallor may be present or a flushed skin from vaso-motor disturbance. Very rarely there is a true hysterical fever.

All forms of *digestive disturbance* occur in hysteria—anorexia, depraved or voracious appetite, flatulence, nausea, vomiting, etc. The patient may become greatly emaciated from voluntary starvation or inability to retain food. Constipation is the rule, but diarrhea is by no means uncommon. "Hysterical joints" show tenderness, restricted motion and even swelling.

The psychical disturbances found in hysteria have already been alluded to. In addition to the fitfulness of temper, the willfulness and tendency to melancholy there may be hysterical laughing, crying, outbreaks of passion and maniacal excitement. The hysterical person is always self-conscious; she demands attention and presents no active symptoms of her disorder except when under observation.

2. The Convulsive Stage.—The convulsion is not an invariable part of hysteria. Indeed, it is rare in this country and the only evidences of the condition are found in such stigmata as may be present. The paroxysm is always preceded by prodromes. These include moodiness, mental irritability, excitability, laughing and crying, sleep disturbed by bad dreams, and digestive disturbances. The patient is conscious of the significance of these symptoms. There is distinct aura; this includes the rising of an imaginary ball in the throat (globus hystericus), hysterical headache (clavus), shortness of breath and hyperesthesia of the hysterical zones. The convulsion follows. Four forms are described by Charcot, as follows:

1. *Epileptoid Form.*—This resembles epilepsy and is frequently called hystero-epilepsy. With a cry the patient falls to the floor. At first there is tonic spasm, with rigidity of the muscles and sometimes opisthotonos. Following there are clonic movements in which the face is convulsed and the body is violently thrown about but in such a way as to cause no injury to the patient. The eyeballs are turned up and roll about, and the lids twitch. Consciousness is not entirely lost. The patient never bites his tongue or falls in such a way as to hurt himself. As the convulsion subsides he becomes quiet and usually

passes into a light sleep. The attack lasts somewhat longer than in epilepsy.

2. *The Gymnastic Form* (Clownism).—Here the patient makes various grotesque or exaggerated movements and postures, as jumping, dancing, etc. The "dancing mania" of the Middle Ages or the exhibitions of "the power" sometimes still seen in individuals under the influence of religious excitement belong to this class.

3. *The Dramatic or Cataleptic Form.*—In this form the patient poses in various attitudes suggested by the emotions by which he is temporarily influenced. Consciousness is present, but the patient may pass into a trance-like condition in which the limbs remain for days in any position in which they are placed (catalepsy).

4. *Delirium.*—This may follow the convulsion. It is usually of a mild form and associated more or less with melancholia. Consciousness is maintained and motor disturbances may follow, as described.

DIAGNOSIS.—This is often very difficult on account of the tendency for the symptoms to simulate those of more serious diseases. A careful study should be made of each case; no mere array of subjective symptoms is sufficient to establish the diagnosis.

HYSTERO-EPILEPSY.	EPILEPSY.
Excited by emotional causes.	Appears without apparent cause.
Prodomes and an aura always present.	Prodromic symptoms often absent.
Onset often gradual.	Onset usually sudden.
Patient never injured; tongue never bitten.	Patient often injured by fall or convulsive movements; tongue often bitten.
Tonic and clonic movements, but more like violent "struggling" and partially under control of will.	Tonic followed by clonic muscular spasm.
Patient conscious.	Patient unconscious.
Fecal or urinary incontinence never occurs.	Incontinence often present.
Convulsion may be prolonged.	Lasts but a few minutes.

The following table illustrates the differential diagnosis between hysterical and organic paralysis:

Hysterical Paralysis.	True Paralysis.
Neurotic history; sometimes excited by traumatism.	Always due to degenerative diseases of the brain or spinal cord which may or may not be excited by traumatism.
Hysterical stigmata present.	No stigmata.
Wasting of muscles slight or absent.	Wasting of muscles usually marked.
No reaction of degeneration.	Electrical reaction of degeneration.
Degree of location of paralysis may vary.	Paralysis permanent and unchanging.
Paralyzed limb is dragged.	Paralyzed limb is swung in circular manner outward and forward.
Facial muscles never involved in hemiplegia.	Facial muscles always involved in hemiplegia.
Motion appears before sensation.	Sensation reappears first.

For the differential diagnosis between hysteria and neurasthenia see the latter.

Prognosis.—As regards life, good. Complete cure is difficult, especially if the disease appeared in early life. In such cases there are likely to be recurrences from time to time.

Treatment.—Mainly hygienic. We have to correct not only a physical defect but a long-standing mental attitude or psychosis. Naturally, the earlier treatment is commenced the better. When possible it should be prophylactic, that is, in neurotic families the greatest care should be taken to "bring up" the children with sound bodies and energetic wills. A pleasant home life, where the surroundings are congenial and habits of cheerfulness, obedience and self-control are engendered, is of first importance. Much depends upon the parents. Regular hours of eating, study, sleep and recreation should be enforced. Overstudy and mental strain or excitement should not be allowed. Plenty of outdoor exercise and an abundance of simple, nourishing food should be supplied to meet the wants of the growing body.

In the main, these directions will apply to the older hysterical patient. We should see to it that she is properly clothed, properly nourished, avoids excitement and leads a simple, unemotional life. Excesses of all kind must be absolutely prohibited. Food must be easily digested, an abundance of water drunk and no stimulants (including tea and coffee) allowed. A cold sponge or shower bath, followed by friction every morning, is an excellent expedient. It should not be too cool at first, the temperature being gradually lowered as tolerance is gained. Warm baths are generally to be avoided, but a hot foot bath or alternate hot and cold applications to the spine at night may be useful in cases of insomnia. When there is insufficient exercise, light calisthenics, massage and faradism should be employed.

Suggestive therapeutics is of the greatest importance. The physician should inspire the patient with confidence—with his ability to effect a cure, and use every effort to change her entire mental attitude. Hypnotism is only another expression of this effort, but in intractable cases it may be necessary to make use of it. Christian science, magnetic healing, *et omne id hoc*, work their miracles of healing in these patients by touching the faith in the mysterious, which is more or less present in every one and especially so in the hysterical.

The home surroundings are in very many cases unfavorable for successful treatment. It is often necessary to get the patient away from sympathizing friends. Where possible she should be placed in a suitable institution and given the Weir Mitchell rest cure. This consists of putting the patient to bed under the care of a discreet nurse. She is allowed to do nothing, not even to talk or read. Massage, electricity and baths are given daily. The food is the simplest and most nutritious, consisting at first of milk alone. The variety and quantity is increased until all is given that can be digested. Light exercise is gradually allowed and more liberty, including walking and driving in the open air. Marvellous improvement sometimes follows this method of treatment.

Few drugs are required and these only to meet special indications. Morphin should be avoided. Iron, arsenic, strychnin, hypophosphites, malt and cod-liver oil may be required if there is anemia or great debility. The best anti-spasmodics are asafe-

tida, valerian, sumbul and the like. In rare instances the bromids may be required. A formula much used by Goodell in hysterical women is:

Arsenous acid	gr. ½
Iron sulphate	gr. 20
Ext. sumbul	gr. 20
Asafetida	gr. 60

Make 20 pills. One after each meal.

A convenient way to administer asafetida is in 10 grain suppository.

Hysterical convulsions may sometimes be brought to a close by an unexpected shock, as dashing cold water in the face. Vomiting induced by a hypodermic of apomorphin, or pressing upon the sensitive ovary, may have the same effect. Inhalations of an anesthetic may be required. Extreme measures should be avoided and not too much attention given the patient.

Contractions and paralyses often yield to the prolonged use of massage and electricity. Anesthesia does best under applications of the faradic brush.

ICTERUS—See Jaundice.

IMPETIGO CONTAGIOSA.

DEFINITION.—An acute, contagious, inflammatory disease of the skin characterized by the formation of flat vesicles or blebs, which become pustular and finally dry up, forming flat scales or crusts.

ETIOLOGY.—Impetigo contagiosa is most frequently seen in infants and children, and where the hygienic surroundings are poor. It is sometimes epidemic, but rarely so, outside of institutions. The disease is contagious and auto-inoculable. Its exact cause is not yet positively settled but it is supposed to be parasitic. According to Sabourand (Ann. de Derm. et de Syph.), who has recently made an exhaustive study of this disease, it is due to the presence of the streptococcus of Fehleisen, and there is another form of impetigo caused by the staphylococcus of Rosenbach; the two forms may be mixed. Other investigators reach similar results.

SYMPTOMS.—The disease usually commences with the appearance of a number of flattened vesicles upon the face or hands;

they may, however, appear on other portions of the body. These increase in size until they are as large as a split-pea or larger and become pustular, sometimes having a slightly reddened areola, but this is never large. They usually come out in crops. The lesions may take on a pseudo-umbilication, slightly resembling smallpox, but this, according to Hyde, is "produced solely by flaccidity of the roof-wall, which is never tied down as in variola." A number of blebs or pustules may coalesce, forming a patch of considerable size. Finally the pustules rupture and dry on the surface as thin, yellowish crusts which soon peel off, leaving reddish spots which heal without forming scars. Itching is slight. Constitutional symptoms may be absent but in severe cases some malaise and fever may precede the eruption. The course of the disease is a week or ten days.

DIAGNOSIS.—More than usual interest attaches to this rather unusual malady on account of certain points of resemblance to smallpox with which it has repeatedly been confused during the present mild epidemic of the latter disease (see Variola).

There is a simple non-contagious form of impetigo with which it may be confused but this is primarily pustular, does not tend to umbilication, coalescence or rupture.

Eczema is attended with severe itching and more severe inflammatory symptoms.

PROGNOSIS.—Good. Recovery is usually complete in one or two weeks.

TREATMENT.—Crusts should be removed by scrubbing the skin with soap and hot water, after which the following ointment is thoroughly rubbed in:

Ammoniated mercury .....gr. 10—30
Benzoated lard .....oz. 1

To prevent auto-inoculation Schamberg recommends the frequent use of a lotion of mercuric chlorid upon the affected and adjacent skin.

IMPOTENCE.

DEFINITION.—Absence of sexual power.

ETIOLOGY.—It may be due to malformation of the genital organs, either congenital or acquired; to old age, premature senility, obesity or debility; to urethral stricture, prostatic

hyperesthesia or disease of the seminal vesicles or deep urethra; to sexual neurasthenia engendered by masturbation, onanism, gonorrhea, excesses in venery or alcoholism; to diseases producing general or local paralysis; to psychical causes, including overstudy, bashfulness, fear and lack of confidence produced by reading "lost manhood" literature; and to various forms of sexual perversion.

SYMPTOMS.—Nocturnal emissions or pollutions while often present are not necessarily symptomatic of beginning sexual impotence; they more frequently indicate repression of sexual desire. Premature ejaculation, imperfect erections or failure of erection are considered evidences of the disease. These symptoms are often apparent rather than real, since they may disappear under favorable conditions. Other symptoms are irritability of the deep urethra, difficulty of urination, sometimes incontinence of urine or vesical tenesmus, neuralgic pains in the testicles, pain in the back and legs, spinal irritability, headache, derangement of the stomach and bowels, constipation, and mental dulness. With loss of sexual power sexual desire often remains as strong as ever and makes the victim a sexual hypochondriac of the worst kind. He broods over his "lost manhood" until he may be apparently on the verge of insanity.

PROGNOSIS.—Favorable in cases due to psychic causes. Where there is nervous exhaustion or beginning atrophy it is unfavorable.

TREATMENT.—Hygienic treatment is more effective than medicinal. It should include change of surroundings and habits, in order to direct the mind of the patient away from the local trouble; gentle outdoor exercise, avoiding bicycling or horseback riding, since these may cause irritation of the deep urethra; massage and hydrotherapy. Zabludowski of Berlin employs massage in the genital region, applied gently to the testicles, perineum and inguinal region, commencing on the inner surface of the thighs in hypersensitive persons and finally making alternate pressure and vibration to the bulbous urethra. Manipulations through the rectum are used if local changes are manifested in the prostatic urethra. Erections do not appear if massage is properly performed and are undesirable. The food should be the most nutritious but stimulants of all kinds are to be avoided.

Hydrotherapeutic measures of special value are salt water baths, the cold shower and sponge bath, followed by friction, and the alternate hot and cold douche to the spine. Electricity will be found useful, including galvanic and static applications to the spine and the interrupted current passing from the perineum to the glans and from the groin along the spermatic cord to the testicles. When there is hyperesthesia of the deep urethra the passage of the cold sound or the use of the psychrophore or cooling sound of Winternitz, through which ice-water is allowed to run, sometimes give excellent results. Mild galvanic currents may also be used within the urethra or weak caustic solutions, as nitrate of silver. Sexual intercourse should be abstained from while the patient is undergoing treatment.

When imperfect erection is due to too rapid emptying of the vessels of the penis ligation of the dorsal vein has been tried with some success. Rubber constrictors have also been recommended for this purpose.

A multitude of aphrodisiacs have been proposed. The most successful are those which are really nervous tonics, as strychnin, nux vomica, iron and phosphorus. Ergot is of some value if there is an atonic condition of the vessels. It is sometimes injected hypodermically near the dorsal vein when this is emptied too rapidly. The most common aphrodisiac is cantharides which causes an increased flow of blood to the urinary organs. Damiana has been much vaunted but is of doubtful value. Below are given a number of prescriptions much used in the treatment of impotence:

Zinc phosphid .....gr. 2
Ext. nux vomica.....gr. 5
Make 20 tablets. One or two tablets three times a day.

Ext. damiana .....gr. 40
Ext. nux vomica.....gr. 2½
Zinc phosphid .....gr. 2
Cantharides .....gr. 1
Make 20 tablets. One every three or four hours.

Tinct. cantharides .....gtt. 6
Tinct. iron chlorid.....gtt. 15—20
Take three times a day, well diluted.—H. C. Wood.

Zinc phosphid .....gr. $\frac{1}{8}$
Ext. nux vomica.....gr. $\frac{1}{8}$
Ext. cannabis indica.....gr. $\frac{1}{8}$
Take in tablet three or four times daily.

Gold and sodium chlorid.....gr. 1
Sodium arsenate .....gr. $\frac{1}{2}$
Barium chlorid .....gr. 4
Ext. nux vomica.....gr. 12
Ext. cannabis indica.....gr. 6
Make 24 pills. One pill after meals, in debilitated subjects with spermatorrhea.—Bartholow.

Tinct. sanguinaraia .....dr. 2
Ext. hoang-nan .....dr. 2
Fl. ext. ergot.....dr. 2
Twenty to 40 drops in water, three times a day, for impotence and seminal weakness.—Shoemaker.

INCONTINENCE OF URINE—See Enuresis Nocturna.

INFLUENZA; LA GRIPPE.

DEFINITION.—An acute contagious disease, often epidemic, characterized by catarrhal inflammation of the respiratory or digestive tract, profound nervous depression and a tendency to complications.

ETIOLOGY.—Caused by a specific bacillus discovered in 1892 by Pfeiffer. This is found in the nasal and bronchial mucus. The disease is contagious and more prevalent and fatal in the winter months, though it may occur at any season of the year. It is transmitted by the fomites and is probably also air-borne. The first attack does not confer immunity; on the contrary it often leaves a tendency to recurrence.

PATHOLOGY.—The morbid changes are those of a catarrhal inflammation of the respiratory or digestive tract, depending in degree and location upon the part affected and the severity of the disease. If there are complications, as pneumonia, pleurisy, meningitis, myelitis, pericarditis or nephritis, the morbid changes are those characteristic of the complicating disease.

SYMPTOMS.—After a period of incubation of one to five days, during which there may or may not be some malaise, the disease usually commences suddenly with chilliness or a decided chill, followed by a rise of temperature (101° to 105° F.). The chill

may be replaced by a fainting attack or in children by convulsions or vomiting. The fever persists throughout the disease, is irregular in type and marked by distinct remissions. Recurring chills are not uncommon. Severe frontal or temporal headache or pain in the eyeballs, and pain in the back and muscles are present in practically all cases. The most characteristic symptom is the marked sense of weakness and physical and nervous prostration, sometimes amounting to actual collapse. This is present, in greater or less degree, in every case of grip.

According to the special localization of the disease three *clinical types* of influenza are usually described: (1) The catarrhal; (2) the gastro-intestinal; (3) the nervous. These are seldom entirely distinct; in nearly every case there is some merging into each other of the symptoms of the different forms. There are comparatively few cases in which coryza is entirely absent or where myalgic or neuralgic pains and other nervous symptoms do not occur.

1. *The Catarrhal Form.*—The earliest symptoms of the catarrhal form are those of an ordinary "cold in the head," viz., sneezing, running at the nose, reddened, watery eyes, followed by sore throat, hoarseness and later by a troublesome, hacking cough which is worse upon lying down and resists ordinary remedies. More or less headache and myalgic pains, as already described, are present and the prostration is extreme. The febrile symptoms usually disappear within a week but convalescence is very slow and it may be months before the patient regains his strength. The tendency to the development of bronchitis, bronchopneumonia or lobar pneumonia is marked.

2. *The Gastro-Intestinal Form.*—Cases of this variety are comparatively rare and occur most frequently in children. They are characterized by nausea, vomiting, epigastric distress, abdominal pain and tenderness, and diarrhea. When the upper portion of the intestine is most affected there may be slight jaundice, tenderness in the hepatic region and constipation. Prostration is always great and there are the headache and other pains. A *typhoid form* is described in which there is a dry, brown tongue, sordes on the teeth, stupor, delirium and other nervous symptoms.

3. *The Nervous Form.*—This occurs frequently, though not

so often as the catarrhal form. Intense headache marks its inception or the patient may be suddenly overcome by muscular weakness and prostration. The pains in muscles and back are unusually severe or there may be distinct neuralgic pains. Insomnia and depression of spirits are most troublesome. Sometimes there is delirium. Other cases present symptoms similar to those of meningitis, with occipital headache, rigidity of the neck muscles, sensitiveness to light and sound, and hyperesthesia of the skin.

COMPLICATIONS.—The most serious complication is pneumonia. This may be lobar or bronchial. *Lobar pneumonia* is most likely to occur during convalescence as a result of exposure. Its symptoms are then sudden and its course rapid. When it occurs early the initial chill and the pain in the side are often absent. The rusty sputum may also be wanting. Dyspnea is usually severe. *Bronchopneumonia* is often recognized with difficulty. G. R. Butler (Medical News) gives these distinctive features of the disease: "Varying degrees of dulness over both chests posteriorly, with weak respiratory sound, impaired transmission of voice sounds and a shower of fine and subcrepitant rales at the end of a deep inspiration, heard in scattered areas or patches, especially at the bases." Pleurisy may occur with pneumonia or alone.

Heart weakness is prominent. In most cases this does not amount to actual disease but is shown by rapid, feeble pulsation, rarely by bradycardia. Pericarditis, endocarditis, or angina pectoris sometimes develop. If there is a chronic heart disease it is likely to be intensified.

Neuritis is a frequent nervous complication and may cause great suffering. Various portions of the body may be affected. Delirium sometimes appears. Cerebro-spinal meningitis and other diseases of the central nervous system are rare complications. Cases of insanity have been attributed to influenza.

Otitis media is quite common. Skin eruptions have been noted by Rieger and others.

A special tendency of influenza is to light up into activity chronic diseases of the lungs, heart and kidneys.

DIAGNOSIS.—The characteristic features of the disease are the sudden attack, the presence of a catarrhal inflammation (in most

cases) and the great prostration, which is out of all proportion to the apparent severity of the symptoms. Active febrile symptoms are usually short in duration. In doubtful cases a bacteriological examination of the sputum should be made. The differential diagnosis from cerebro-spinal meningitis and typhoid fever is easily made by keeping the patient under observation for a few days.

PROGNOSIS.—The prognosis is good, apart from the complications. The mortality in different epidemics ranges from ½ to 2½ per cent. The great weakness, the tendency to pulmonary disease and the lighting up of old disorders make it, however, an extremely serious disease.

TREATMENT.—It is of primary importance in influenza to keep your patient quiet. He should at least be forbidden to expose himself by going about his daily duties; if possible he should be sent to bed. In severe cases this must be insisted upon, since the slightest exposure may produce copious perspiration when a cool draft will chill the skin and perhaps precipitate an attack of pneumonia. It is also important to isolate him as far as possible, as the disease is contagious. The diet should be light but nutritious.

There is one condition common to all cases of influenza which demands special care and watchfulness, viz., the great prostration. In practically every case there is also severe headache and aching pains. This symptom, in the mind of the patient, often overshadows everything else. There is no specific for treating influenza. We must meet the indications as they arise, and outline our treatment according to our patient's age, strength and the character of the disease-manifestations. When seen early a full dose of calomel and soda (5 to 10 grains each) should be given, or if the stomach is irritable the calomel may be given in small doses as follows:

Calomel	gr. 2—4
Sodium bicarbonate	gr. 12
Bismuth subnitrate	gr. 24

Make 12 powders. One every half-hour to hour until the bowels move. Follow with citrate of magnesia or a neutral aperient water, as Hunyadi or Apenta.

At the outset of an attack a "sweat" is of undoubted value,

helping to eliminate the toxins, relieve visceral congestion and diminish the severity of the pain. This is most simply given by placing the patient upon a chair, with a cane or perforated seat, wrapping him thoroughly in blankets up to the neck and placing beneath the chair a vessel containing a gallon or more of very hot water. Free perspiration will usually be established in a few minutes, after which he should be placed in a bed previously warmed, and given warm drinks. If the patient is weak the same result may be accomplished by surrounding him, well covered with blankets, in bed, with hot water bottles, bricks or flatirons. If the patient is strong and there are no evidences of cardiac weakness, pilocarpin is a good drug at this stage. Johnson (St. Louis Medical Review) finds that $\frac{1}{8}$ grain given with a weak whisky toddy, with the patient wrapped in a warmed blanket produces free diaphoresis without depression. Dover's powder in 5 or 10 grain doses is also much used for this purpose.

As we have already said there is no specific for influenza, but the drug which is most generally useful is undoubtedly quinin. It certainly has a tonic effect, and according to Finkler of Bonn, who made experiments upon a squadron of soldiers, it has distinct antitoxic powers. He gave it in doses of $7\frac{1}{2}$ grains in $\frac{1}{2}$ ounce of whisky daily. It is usually given in 3 to 4 grain doses every 3 or 4 hours, variously combined with Dover's powder and other opiates and with the coal tar antipyretics. As to the value of the last named drugs there is great difference of opinion. Where there is profound depression they are certainly contraindicated, but as Jacobi points out we should not forget that most of them are "also nervines, analgesics and diaphoretics, thus improving comfort and metabolism." In moderate doses for the relief of pain their use may be considered justified. Drugs of this class are acetanilid, antikamnia, phenacetin, antipyrin, kryofin, etc. A very valuable class of remedies are the salicylic acid compounds, including salol, sodium salicylate, salipyrin (a compound of salicylic acid and antipyrin) and salophen. To obviate the depressing effect of these drugs, caffein, strychnin, spartein and camphor are given in combination with, or alternately with them. Below are combinations that may be used:

Codein sulphate .....gr. 6
Phenacetin .....dr. 1
Salol .....dr. 1
Divide in 12 powders. One every three or four hours.

Quinin sulphate .....gr. 36
Dover's powder .....gr. 36
Camphor monobromid .....gr. 12
Make 12 capsules. One three or four times daily.

Dover's powder .....dr. ½
Salol .....dr. ½
Phenacetin .....dr. ½
Make 12 capsules. One every two or three hours.—Tyson.

or Phenacetin .....dr. ½
Salol .....dr. ½
Pilocarpin .....gr. 1
Make 12 powders. One every two or three hours. To children, in cases of moderate severity, Sheffield gives:

Sodium benzoate .....gr. 1½
Salol .....gr. 1½
Acetanilid .....gr. 1½
Caffein .....gr. ¼
Make one powder. One powder every three hours to a child six years old. If the pain is severe and the child is kept awake, add one-twelfth grain of codein sulphate to each powder.

When children refuse to take powders he prescribes the following mixture, adding codein if necessary:

Sodium benzoate .....dr. ½
Antipyrin .....dr. ½
Ammon. Sol. anise.....dr. 2
Comp. syr. squills.....dr. 2
Syrup althea .....oz. 1½
Anise water, enough to make.....oz. 2
One dram every three hours to a child six years old.

Inhalations of compound tincture benzoin and turpentine are of great value when the respiratory symptoms are marked. A dram or two of either should be placed in a kettle of very hot water and the steam inhaled.

Johnson advises giving to children a mixture containing ammonium salicylate and antipyrin. These may be given in solution in suitable doses or with syrup of raspberry or other agreeable vehicle.

Wilcox (Med. News) speaks highly of gelsemium in influenza. It should be pushed until slight ptosis appears, which is the

limit of its physiological activity. The following formula may be used for its administration.

Acetanilid ..... dr. 1
Alcohol (enough to dissolve) .....
Tinct. gelsemium ..... dr. ½
Syrup ginger, enough to make .... oz. 2

Teaspoonful every two or three hours.

Hansberger (Phila. Med. Jour.) praises potassium bicarbonate, which he considers of almost specific value. He gives it in large doses (30 grains) dissolved in milk or water, every four hours.

In the respiratory form of the disease the cough is often troublesome and may resist morphin and the opium derivatives. In this form Wilcox finds that ammonium carbonate in 5 to 10 grain doses, given in two ounces of milk, will relieve chest oppression, strengthen the heart and check the cough. For application to the throat and nose, sprays like the following are to be used:

Menthol ..... gr. 5
Eucalyptol ..... gr. 5
Liquid vaselin ..... oz. 1

Various medicaments are used for the relief of cough. Heroin ($^1/_{12}$ grain) in tablet form, codein (¼ to ½ grain), and paregoric, morphin and other opium preparations are used. Below are formulas:

Morphin sulphate ..... gr. ½
Syrup squills ..... dr. 2
Syrup lacticarium ..... dr. 4
Water ..... dr. 6

Teaspoonful every two to four hours.—Wilson.

Codein sulphate ..... gr. 4
Ammon. chlorid ..... dr. 5
Syr. wild cherry ..... oz. 2
Comp. spts. juniper, enough to make ..... oz. 4

Teaspoonful every two or three hours.

In the gastro-intestinal type, we must often withdraw food, to prevent vomiting, and feed by the rectum.

Hypodermics of morphin may be required to check gastric irritability, if unrelieved by small doses of calomel and bismuth. When the stomach becomes tolerant, gastric and intestinal antiseptics, as salol, bismuth, beta-and benzo-naphthal, will be found

useful. Liquid nourishment, as liquid peptonoids or panopepton, should be given as early as possible.

In cases where there is great depression of the nervous system, stimulants are required. Resort to alcoholics is of questionable utility, unless the patient is accustomed to their use. Strychnin sulphate or nitrate is the best stimulant and should be given in doses of good size ($^1/_{30}$ to $^1/_{20}$ grain) three or four times daily. Aromatic spirits of ammonia, camphor, digitalis and spartein have their uses. According to Jacobi one of the best stimulants for children is musk. It may be given in the gravest cases, 5 to 10 minims of the 10 per cent tincture every half hour until half a dozen or a dozen doses have been taken. Camphorated oil injected hypodermically is an excellent diffusable stimulant. Another drug of considerable value to abate the nervous symptoms of the declining stage of the disease is asafetida. Three to 5 grains may be given by the mouth several times a day in pill form, or if it causes disagreeable eructations it may be administered in suppositories, each containing 10 grains of the drug.

INSOMNIA.

DEFINITION.—Inability to sleep; sleeplessness.

ETIOLOGY.—Insomnia is not in itself a disease; it is a symptom of some functional or organic disorder. The nervous temperament is a predisposing cause in most cases of simple insomnia. It is most common in women and in old age. Anxiety, worry, and all forms of mental activity produce it. It may become a habit, through the influence of auto-suggestion. Tea, coffee, tobacco and other drugs are sometimes responsible for inability to sleep. It may be symptomatic of acute or chronic diseases, such as indigestion, constipation, lithemia, syphilis, neurasthenia, heart disease, rheumatism, typhoid and other infectious fevers. It is one of the most troublesome symptoms in some forms of insanity. Not infrequently it is due to pain. The cases of insomnia, which we are most frequently called upon to treat and which are most difficult to treat successfully are those inveterate forms due to the combined influences of habit and excessive mental activity.

TREATMENT.—Success in treating inveterate insomnia de-

pends upon making a radical break in the patient's habits. Where possible he should be relieved from the mental strain or business cares which are usually the starting point for the vicious circle of habit. Few persons can afford the trip abroad or the extended sea voyage recommended in text-books. Many can, however, manage to secure a temporary respite which will be of the utmost value. If the patient is a resident of a city a vacation spent in the country, or, better still, a fishing or hunting trip, during which he lives, eats and sleeps in the open air, will often work a complete cure. A complete change of scene and surroundings, with physical exercise enough to produce slight fatigue and a mental avocation that serves to entertain and amuse, is the best treatment for the majority of cases. These ends may in a large degree be secured in the patient's home but it is more difficult. It is so easy to keep in the old ruts of habit, mental as well as material. But here hygienic measures are also the most valuable.

Exercise.—Outdoor exercise is of great importance. Horseback riding, cycling, tennis, walking, swimming, golf and other outdoor sports should be encouraged. The patient should, however, be instructed to avoid great fatigue. In lieu of these, light calisthenics may be tried. Dumb-bells and Indian club exercises or the Delsarte movements may be gone through with morning and night, adjusting them to suit the patient's strength. Light exercises may even be performed in bed, but these act as much by distracting the patient's mind as by their physical effects.

Massage is a form of exercise especially suited to those who lack the vigor to carry on more active exercise. It increases the nutrition of the tissues, stimulates metabolism and the excretion of waste products and starts the blood to circulating naturally through the capillaries of the skin, thereby relieving visceral and especially cerebral congestion. Massage given at night has a markedly sedative effect upon the nervous system and predisposes to sleep.

Baths.—The effect of a hot bath or a warm foot-bath before retiring in encouraging sleep is well known. It does so by bringing the blood to the surface, equalizing the circulation and producing slight cerebral anemia. Hot, wet compresses applied

to the abdomen and covered with some impervious material, so as to retain the heat, have a similar effect. The abdomen is very rich in blood-vessels and their engorgement by this application relieves the cerebral tension. Cold baths with friction are useful in stimulating functional activity and salt water bathing at the seashore has in addition to its physical effect the psychical one due to new scenes and surroundings. Cold compresses applied to the head at night are sometimes useful.

Electricity is undoubtedly useful in insomnia. It has the muscular effect of exercise with some sedative effects of its own. Electricity and massage may be employed in conjunction. Of the currents, both the faradic and galvanic may be used. Shoemaker (Indiana Med. Journal) says the galvanic current has an admirable influence in overcoming chronic wakefulness. "The negative pole, or cathode, is placed at the back of the head and the positive pole, or anode, to which a sponge is attached, moved across the forehead." A force of 10 to 20 milliamperes is usually sufficient. The applications are made in the evening as the customary time for retiring approaches.

Diet.—The diet should be adjusted to the needs of the patient. It is absurd to lay down rules for all. The vigorous and the debilitated require essentially different treatment. It is a mistake to over feed. In some cases indigestion is responsible for insomnia; in these, a light, very easily digested supper is indicated. In many others a little food just before retiring or even in the night serves to divert the blood from the excited brain. A glass of hot milk and a cracker serves a useful purpose in such cases. Rarely a little hot whisky punch at bedtime may be permissible, but great care should be exercised in prescribing this. It is often beneficial to the anemic and debilitated and is a useful hypnotic in insomnia due to tobacco.

Mental Hygiene.—The most important and most difficult thing to do is to change the patient's methods of thought. He must be educated into a way of life in which he does not carry his worries to bed. The best way to crowd out old ideas is to put new ones in. It is a good thing to cultivate a fad—a mild and harmless one—to employ the non-working hours. Photography, "collecting," and outdoor science of any kind are especially good, since they take one out of doors. In the evening, reading

a good book, not an exciting one, is an agreeable diversion and sometimes the best of hypnotics. Music of the right kind has a decidedly sedative effect upon most every one. Suggestive therapeutics, not hypnotism necessarily, has undoubted value in these cases and comes within the province of the physician.

Medicines.—In spite of our hygienic and other measures there are cases which demand medicinal treatment. This is especially true of the cases symptomatic of disease. Chloral hydrate is the most reliable hypnotic but is depressing and must be used with caution, especially if there is weakness of the heart. The dose is 10 to 20 grains. Hare gives it in the following manner:

Chloral	dr. 3
Syrup	dr. 4
Cinnamon water, enough to make	oz. 3

Dessertspoonful at night.

If the insomnia is due to pain he associates it with morphin as in the following:

Chloral	dr. 2—4
Morphin sulphate	gr. 2
Syr. lactucarium (Aubergier)	oz. 2
Water, enough to make	oz. 3

Dessertspoonful in water at bedtime, to be repeated in an hour if necessary.

Chloral may be given by the rectum, either as an enema made with white of an egg or in the form of a suppository.

When the insomnia is due to a highly wrought emotional state potassium bromid is often the best drug. It should be given in moderate doses several times a day and a larger one at night, which may be combined with chloral. An excellent hypnotic mixture of this class is the Mistura Chlorali et Potassii Bromidi Comp. of the National Formulary. Its composition is as follows:

Chloral	gm. 25.00
Potassium bromid	gm. 25.00
Ext. cannabis indica	gm. .20
Ext. hyosyamus	gm. .20
Alcohol	cc. 6.00
Tinct. quillaja	cc. 6.50
Water	cc. 100.00

Next in value to chloral as pure hypnotics are the newer drugs belonging to this class, including sulphonal, trional, paraldehyd,

chloralamid, amylene hydrate, somnal and chloretone. The first two are the most popular and are nearly free from depressing results. Sulphonal is slow in action and should be given two hours before sleep is desired. The dose is 10 to 20 grains, best administered in hot water or hot milk. Trional is a little more rapid and equally effective. The dose is the same. Paraldehyd is an excellent hypnotic but is disagreeable in odor and taste. It is best given in the Elixir Paraldehydi, N. F., of which the dose is a teaspoonful to a tablespoonful (15—60 grains of the drug). Chloralamid is also a good hypnotic and rapid in its action. The dose is 10 to 30 grains, which may be repeated. Chloretone is the most recent of the hypnotics, said to be entirely free from depressing effects and certain in its results. The dose is 10 to 20 grains. It is best given in tablets.

Hyoscyamus and its alkaloid hyoscin are valuable in insomnia. In the insomnia of insanity a hypodermic of hyoscin hydrobromate ($^1/_{100}$ grain) is often very effective. Duboisin ($^1/_{150}$ grain) may replace it when excitement is a prominent symptom. Cannabis indica is also much used, especially in combination with the bromids. Shoemaker finds it particularly useful in sleeplessness complicated with pain or spasm.

Opium, as every one knows, will produce sleep but its use should be reserved for cases in which there is pain. Dover's powder was a favorite hypnotic with an earlier generation. The drug is not suitable for habitual use.

INTERMITTENT FEVER—See Malaria.

INTESTINAL INDIGESTION—See Diarrhea and Dysentery (Enteritis).

IRITIS.

DEFINITION.—Inflammation of the iris.

VARIETIES.—Plastic, serous, suppurative and tubercular.

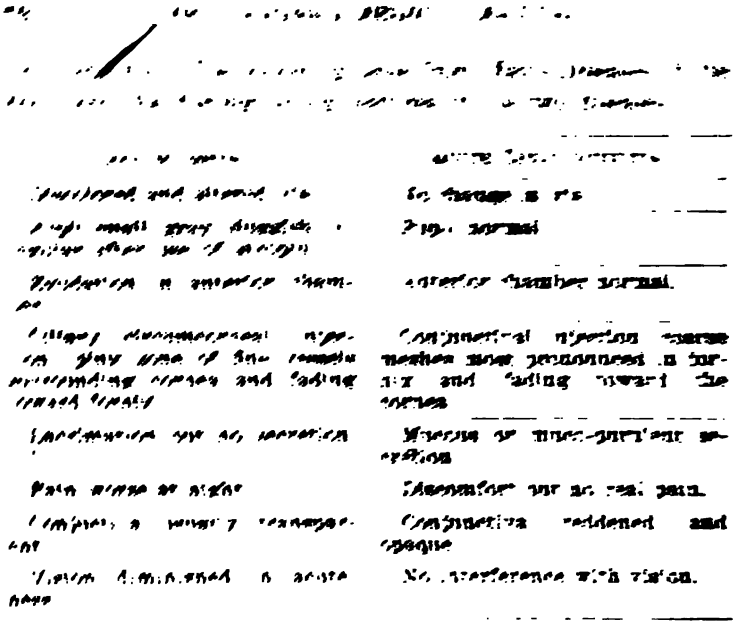
ETIOLOGY.—It may be caused by some general debilitating disease, such as syphilis, rheumatism, tuberculosis, gout, gonorrhea, diabetes, or nephritis; or by an acute infectious disease. It is most often due to extension of inflammatory processes in neighboring parts—as from an acute conjunctivitis. Injuries of the eye may also cause iritis.

PATHOLOGY.—At the beginning of the attack there is congestion of the vessels of the iris, with contraction and discoloration of the pupil. This soon proceeds to actual inflammation and the throwing out of an exudate into the chambers of the eye; the character of this determines the variety of the disease. In the *plastic* form it is fibrinous and tends to form adhesions to the capsule of the crystalline lens. In the *serous* it is watery, clouds the aqueous humor and is deposited upon the posterior surface of the cornea. In the *suppurative* form the exudate is purulent; if it finds its way into the anterior chamber it is called hypopyon. In the *tubercular* there are small tubercles or nodules formed on the iris. These may also be true gummata, disappearing under syphilitic treatment. The exudate produces dimness of vision by clouding the aqueous humor, by causing opacity of the cornea and by producing adhesions.

SYMPTOMS.—The subjective symptoms consist of severe pain in the eye, radiating over the temples and forehead and worse at night. In the serous form this and the other subjective symptoms are less marked. There is also lacrimation, the eye is extremely sensitive to light and there is more or less dimness of vision.

Upon examination the ring of vessels surrounding the cornea are found to be injected and the pupil is contracted, usually grayish in color and sometimes irregular in outline on account of the formation of adhesions between the iris and lens. This is best observed after instillation of atropin. But in the serous form there may be dilation of the pupil and in the suppurative there is a yellowish cast from discoloration with pus. The iris is swollen, dull and lustreless, and the color of the eye becomes changed to a greenish or muddy hue. Sometimes when adhesions form, communication between the anterior and posterior chambers is shut off and the iris bulges forward. This requires immediate iridectomy to save the eye. Inflammation of the ciliary body (cyclitis) is marked by increased tension, tenderness of the eyeball, deposits on the posterior surface of the cornea and increased dimness of vision. It is present in most cases.

DIAGNOSIS.—Too often proper treatment of iritis is postponed because the disease is mistaken for an ordinary attack of



Iridocyclitis (iritis) is an extremely serious and dangerous disease. While it seldom endangers the life it is very likely to cause permanent disability of the eye and often complete blindness. The most frequently follows extensive circular adhesions which bind the margin of the iris to the lens and prevent the circulation of fluid between the anterior and posterior chambers. This causes a secondary glaucoma, with subsequent atrophy and disorganization, terminating in permanent blindness. The purulent form usually terminates in loss of sight, sometimes within a few hours.

TREATMENT. Rest is essential. In the acute stage the patient should be put to bed in a darkened room. When the severity of the symptoms has abated he is allowed to go about but should wear colored spectacles and should not be allowed to use the eyes. The patient's general health should receive any needed attention. In most cases it is wise to commence treatment with a brisk cathartic. The diet should be, at first, largely liquid but must be nutritious and made up of easily digested food.

The underlying disease, if such a one can be discovered, should be treated. Syphilitics require mercury and the iodids. Rheumatism suggests sodium salicylate.

Atropin is the indicated remedy. The eye should be put under its influence as soon as possible. It reduces the congestion, prevents the formation of adhesions and helps to break them up if they are already formed. A drop or two of a weak solution (1 to 500) should be instilled into the eye every two hours until the pupil is fully dilated. It should be continued at less frequent intervals throughout the disease. A convenient way to administer it is in the gelatin discs recommended by Dr. Casey Wood. When there is much pain cocain solution (2 to 4 per cent) may be used with the atropin. This seems to add to its effectiveness.

For the relief of pain, hot compresses over the closed lids are followed by marked increase of comfort. In severe cases, which resist treatment, local depletion by means of two or three leeches applied to the temple should be tried. As a substitute the artificial leech may be used. These sometimes have a very decided effect upon the course of the disease. Morphin, phenacetin or other analgesics may be required.

If in spite of treatment extensive adhesions form it is necessary to resort to iridectomy. The severity of the disease and the likelihood of complications and sequelae makes the physician's responsibility in these cases a great one. When possible they should be sent to a competent oculist.

ITCH—See Scabies.

JAUNDICE; ICTERUS.

DEFINITION.—A yellow discoloration of the skin, eyes and other tissues caused by the deposit of bile pigments.

VARIETIES.—Two varieties are usually described. (1) Hepatogenous, in which there is obstruction of the biliary passages and reabsorption of bile; (2) hematogenous, due to the destruction of the red-blood cells or of the liver cells.

According to some recent investigations the latter form does not exist, all forms being due to obstruction. As usually described the conditions producing the latter class are yellow fever, septicemia, malarial hemoglobinuria, arsenical and phosphorus poisoning and acute yellow atrophy of the liver. These are elsewhere described.

ETIOLOGY.—Obstructive jaundice may be due (1) to gall stones (see Cholelithiasis); (2) to catarrhal jaundice (vide infra); (3) stricture of the duct; (4) pressure from tumors from within or without; (5) decreased blood pressure in the vessels of the liver.

ETIOLOGY.—Catarrhal jaundice is caused by inflammation of the common bile duct, usually as a result of gastro-duodenal catarrh. This may be excited by exposure to cold, improper quantity and quality of food, excessive use of tea, coffee or alcohol, passive congestion due to chronic heart or kidney disease, overwork, and certain acute diseases, such as typhoid fever, malaria, pneumonia, etc. It is probable that the disease is in many instances excited by the presence of pathogenic bacteria.

PATHOLOGY.—The morbid changes are those of a catarrhal inflammation of the duodenum and of the common duct. It is most intense at the intestinal end of the duct, whose lumen is sometimes completely closed by the swollen mucous membrane and often choked with a plug of mucus. The inflammation may extend up into the cystic and hepatic ducts. The liver is found enlarged and infiltrated with bile and the gall-bladder is distended with the same fluid.

SYMPTOMS.—The appearance of the jaundice is usually preceded by the symptoms of an ordinary attack of gastro-intestinal catarrh. It is first noticed as a slight pigmentation of the conjunctiva. Then the skin becomes stained a bright yellow color, changing to a greenish shade if the condition persists. In very chronic cases it may take on a bronze-like color; this is generally peculiar to carcinoma. The secretions are also stained by the bile pigments; the urine and sweat are both yellow and the latter may discolor the patient's linen.

There is more or less digestive disturbance, including a coated tongue, fetid breath, loss of appetite, flatulence, a sense of fullness after eating and sometimes nausea and vomiting. The bowels are constipated and the stools are putty-like, grayish or clay-colored and often extremely foul. The color and consistency of the feces is due to an excess of undigested fats. There may be a dull, heavy pain in the hepatic region and some tenderness upon pressure. Enlargement of the liver can be felt upon palpation. The pulse is very slow (40—60) but full.

The temperature is normal or only slightly elevated (100°—101° F.). Often there is a disagreeable itching of the skin, which is worse at night. Dull headache, dizziness and mental dullness are common symptoms and the patient is likely to suffer from insomnia. There is frequently irritability of temper and despondency.

DIAGNOSIS.—The recognition of jaundice is not difficult; to determine its cause is not so easy. A preceding gastro-enteritis, occurrence in a young adult, absence of pain, and emaciation point to catarrhal jaundice as opposed to malignant or serious organic diseases of the liver.

If the jaundice is intermittent, recurs at more or less frequent intervals and is associated with severe colicky pain the symptoms point to an impacted gall-stone.

PROGNOSIS.—Uncomplicated cases of catarrhal jaundice usually recover in one to three weeks, but may persist much longer. When the condition remains chronic some serious disease of the liver or adjacent organs should be suspected.

TREATMENT.—The diet should as largely as possible consist of food that does not require the hepatic secretion for its digestion. Fats should therefore not be eaten and all rich or sweet articles which are likely to undergo fermentation should be excluded. Skimmed milk (which may be made more palatable by the addition of Vichy or Apollinaris), buttermilk, Koumiss, soups and broths free from fat, green vegetables and fresh acid fruits (as oranges and lemons), cooked fruits, stale or toasted bread, eggs, lean meat, the breakfast cereals in moderation, should make up the bulk of the bill of fare. The alkaline table waters are valuable, or in lieu of them plenty of good pure water which serves to dilute the inspissated bile and wash out the bowel. Acid drinks, as lemonade, limeade, or the light sour wines are permissible and often very agreeable to the patient.

To deplete the hyperemic mucous membrane and thereby permit the passage of the bile through the common duct the saline laxatives are the most useful. A dose of either Epsom, Rochelle or Carlsbad salts, or citrate of magnesia, or one of the natural aperient waters, such as Hunyadi, Apenta, Freidrichshall or Franz Josef should be taken every morning. To increase the solubility of the bile, sodium bicarbonate, sodium

salicylate and sodium phosphate are used. The last is considered especially efficacious; one or two teaspoonfuls of the effervescing salt may be taken in water three times a day. It is an excellent remedy for children. The sodium bicarbonate may be combined with rhubarb as in the following mixture, which will be found good when there is acidity with flatulence:

Sodium bicarbonate .....dr. 1
Cinnamon water .....oz. ½
Neutralizing cordial .....oz. 7½
Dessertspoonful three times a day.

Calomel was formerly the favorite drug in this condition. It is less valuable than the salines but may be used to maintain the flow of bile after it is established or to relieve vomiting or nausea. It should be given in small frequently repeated doses (¼—1 grain every hour or two) until the desired effects are produced. A saline laxative should follow.

As an aid to gastric digestion, hydrochloric acid and nux vomica should be given when indicated. Flatulence is relieved by antacids as sodium bicarbonate and antifermentatives as salol, benzo-naphthol, bismuth subnitrate or salicylate and charcoal. The bismuth salts and charcoal have the disadvantage of being constipating. Sodium cholate (5 grains three times a day) and ox-gall are said to be efficacious.

Frequent bathing promotes the elimination of toxins from the skin and relieves the itching. An occasional Turkish bath may be advised. As a further application to the skin, lotions containing carbolic acid, sodium bicarbonate or borax will be found useful.

Daily high injections of cold water at a temperature of 60° to 70° F. and gastric lavage are also highly recommended. They relieve the toxemia and the latter is of special value if there is nausea. The faradic current has also been used to clear out the obstructed ducts.

Blisters may be placed over the hepatic region or the local acid bath may be tried (3 ounces nitrohydrochloric acid to the gallon of warm water). This is a favorite method of treatment in India where cases of sluggish liver are very common. The acid is also used internally. During convalescence it is undoubtedly valuable. Dabney recommends:

Dil. nitrohydrochloric acid.....dr. 6
Tinct. nux vomica.....oz. ½
Tinct. gentian, enough to make.....oz. 4

One teaspoonful three times a day in a wineglassful of water. Take through a glass tube.

KIDNEY, CONGESTION OF THE.

VARIETIES.—The disease may be (1) active, or (2) passive.

ACTIVE HYPEREMIA OF THE KIDNEY.

ETIOLOGY.—It may be caused (1) by drugs which are irritating to the kidney, as cantharides, turpentine, squills, mustard, cubebs, copaiba, potassium chlorate, carbolic acid, arsenic and phosphorus; (2) by sudden chilling of the overheated skin by exposure to cold; (3) by removal or disease of one kidney, thereby increasing the work of the sound organ; (4) by some of the acute eruptive fevers.

Hyperemia is the first stage in inflammation of the kidney (see Nephritis).

PATHOLOGY.—The kidney is enlarged, swollen, of a deep red color and its vessels are filled with blood. The pyramids are prominent, there is some ecchymosis and the renal cells are found to be the seat of cloudy swelling.

SYMPTOMS.—There is dull pain in the region of the kidneys, the urine is scanty, sometimes suppressed, of high specific gravity and contains a trace of albumin and sometimes a little blood and a few hyaline casts. The pulse rate is increased and there is a slight elevation of temperature.

DIAGNOSIS.—The history, the small amount of albumin and the absence of edema serves to distinguish it from nephritis.

PROGNOSIS.—Favorable in the great majority of cases.

TREATMENT.—The patient should be kept in bed in order to maintain an equal temperature of the skin. The diet should be liquid and consist of the blandest substances. Milk and koumiss are nearly always satisfactory. Cloths wrung out of hot water may be applied over the lumbar region and the heat retained by an impervious material as oiled silk or mackin-

tosh, or a hot tub, vapor or Turkish bath may be given to produce sweating. Pilocarpin hypodermically ($^1/_{10}$ to $\frac{1}{8}$ grain) is used for this purpose in severe cases. Mustard, cantharides, turpentine, etc., should *not* be used for counter-irritation, but cupping over the loins sometimes gives decided relief.

The patient should be instructed to drink freely of water, and mucilaginous and alkaline drinks. The bowels should be thoroughly flushed by saline cathartics as Epsom, Rochelle or Carlsbad salts, or any of the natural aperient waters. Potassium citrate or acetate and other non-irritating diuretics may be administered as in the following:

Potassium citrate .....dr. 4
Spirit of nitrous ether.....dr. 4
Syrup orange .....oz. 1
Water, enough to make .....oz. 4
Dessertspoonful in water every two or three hours.

PASSIVE HYPEREMIA OF THE KIDNEY.

ETIOLOGY.—Conditions which obstruct the free return of venous blood from the kidney into the general circulation produce passive hyperemia. The most common are diseases of the heart, lungs and liver—especially the first. It is also caused by the pressure of tumors, a pregnant uterus or ascitic fluid.

PATHOLOGY.—The kidney of passive hyperemia is at first enlarged, smooth and firm, and its capsule non-adherent. The vessels are found to be distended with blood and their walls frequently thickened; they are more prominent in the medullary portion. Later the organ shrinks somewhat in size, the capsule becomes slightly adherent, the vessels are less prominent and there is an increase in the amount of connective tissue. Microscopically there is often found granular or fatty degeneration of the renal cells.

SYMPTOMS.—The symptoms are those of the cause—usually heart disease, viz., dyspnea, disorders of the digestion, constipation, headache and in many cases dropsy. To these are added those of failure of compensation on the part of the kidney, shown by an examination of the urine. The urine is scanty, acid in reaction, dark in color and of a high specific gravity

(1025 to 1035). It contains a small amount of albumin, hyaline casts and sometimes is stained with blood. Urates are deposited upon standing, as a brick-dust sediment. The patient complains of dull pain or weight in the back.

DIAGNOSIS.—Passive hyperemia may be differentiated from chronic nephritis by the comparative absence of albumin, the small number of casts and the undiminished quantity of urea. Dropsy when present is evidently secondary to the cardiac or hepatic disease, whose presence may be detected by physical examination. The exact relation of cardiac and renal disease is often a difficult problem.

PROGNOSIS.—The prognosis is that of the cause; if the condition is due to a failure of cardiac compensation, the outlook is, of course, unfavorable. Most of these cases, however, yield quite readily to treatment and amelioration of the distressing symptoms may be hoped for even where cure is impossible.

TREATMENT.—The ends which we aim to secure by treatment are (1) a reduction of the venous engorgement of the kidney and (2) an increase of the strength of the heart's action, thereby raising the arterial tension. Rest in bed conserves the strength of the heart, a milk diet acts as a diuretic, while furnishing the most readily available nutrient, and local applications to the skin promote perspiration, bring the blood to the surface and relieve internal congestion. For the latter purpose warm baths, hot compresses and dry cups to the loins are indicated. The abdominal congestion is further relieved by unloading the bowels with saline laxatives, calomel or small doses of elaterium. Calomel is also a diuretic.

Digitalis is the best heart tonic. The freshly made infusion is the most reliable form for its administration when it is also desired to increase the flow of urine. One tablespoonful should be given every four hours until free diuresis is produced, when the dose may be reduced, or 10 to 20 drops of the tincture may be given at similar intervals. If the digitalis cannot be used for any reason, strophanthus, spartein or caffein may be substituted.

LA GRIPPE—*See Influenza.*

LARYNGITIS.

ACUTE CATARRHAL LARYNGITIS.

DEFINITION.—Inflammation of the mucous membrane of the larynx, occurring at any age.

ETIOLOGY.—It may be primary or secondary, but more frequently the latter. It is usually an extension upward of bronchial inflammation or downward of acute diseases of the upper air passages. Getting the feet wet or undue exposure to cold draughts, and suddenly checked perspiration are the most frequent exciting causes. There is, perhaps, already a slight hyperemia of the lining membrane. Obstructions in the nasal cavities preventing proper moistening of the air, the inhalation of irritant vapors like ammonia, chlorine, sulphur and tobacco smoke are predisposing causes. Excessive or improper use of the voice frequently brings on this condition. Acute laryngitis occurs most commonly in men because of greater exposure.

PATHOLOGY.—As in any inflammation of the mucous membrane, there is first a dilation of the blood-vessels, followed by dryness due to checked secretion. In appearance there is intense redness with swelling, especially in the arytenoid commissure and ventricular bands. As the vessels of the vocal cords are dilated they may present a streaked appearance or reddened in their entirety. The epiglottis looses its yellowish pink color. At a later stage there is a discharge of mucus which may be seen in streaks with a laryngeal mirror.

SYMPTOMS.—The most important symptoms are cough and hoarseness. The latter may gradually increase until the patient cannot speak above a whisper. The cough is dry and due to the desire to clear the throat of the irritant. It may be painful until secretion is established. In some cases there is pain on swallowing. In the severer types there is a sense of oppression and fullness. The temperature may rise to 101°, but usually the elevation is slight.

DIAGNOSIS.—The even rasping hoarseness and abrupt onset are usually sufficient for a diagnosis. If any doubt exists, however, it is better to use the laryngeal mirror.

In acute laryngitis the vocal cords are generally reddened, although opening and closing evenly without thickening or irregular edges. The mucous membrane is bright red and swollen.

PROGNOSIS.—The disease, as a rule, runs a mild course, ending in resolution in five to ten days.

TREATMENT.—The most essential part of the treatment is entire rest of the voice. When the vocal cords are the parts chiefly affected, the patient should be admonished not to use his voice, but to make his wants known by signs. The air in the room should be kept moist with steam.

As a means of relief from the discomfort and irritation, steam may be inhaled from a teapot or any small vessel with a funnel attachment. The hot water should be medicated with compound tincture benzoin (1 dram to the pint), spirits of camphor (½ ounce to the pint), oil of eucalyptus or of pine needles (1 dram of either to the pint).

This may be used every two or three hours. At the same time, a cold pack may be used over the larynx. Some prefer the application of equal parts of oil of turpentine and olive oil, well covered with absorbent cotton.

Local applications are of little use in the early stage, but cocain in 1 or 2 per cent solutions is recommended, to be followed by an oil spray with 1 per cent of menthol. The patient may spray his nose and throat every two or three hours with the following:

Thymol	gr. 3
Menthol	gr. 10
Eucalyptol	m. 4
Albolene	oz. 2

Later in the disease the pharynx should be cleansed with Dobell's or any good alkaline solution. Applications of astringents such as silver nitrate (1 to 2 per cent solution), protargol (3 to 5 per cent) and suprarenal extract (10 per cent) may be productive of much good.

Internally, calomel in $^1/_5$ grain doses should be given every half hour until five or six doses have been taken, to be followed by a saline cathartic until free purgation is produced. Aconite may be used to control the fever. Large doses of ammonium

chlorid (20 to 30 grains) are said to control the disease very nicely in some cases. Codein in $^1/_{12}$ to $\frac{1}{8}$ grain doses may be used to check the cough. Fluid extract collinsonia (dose 5 to 20 drops) may be given if the hoarseness is difficult to overcome.

LARYNGITIS, CHRONIC CATARRHAL.

DEFINITION.—This is a chronic inflammation of the mucosa of the larynx usually supraglottic, but may extend over the entire area.

ETIOLOGY.—Repeated attacks of acute laryngitis frequently lead to the chronic form. It may be simply a catarrh involving the respiratory tract. In diathetic disorders the larynx may be the point where the faulty metabolism is manifest in inflammation. Excessive and improper use of the voice by singers and outdoor speakers is a frequent cause. Those inhaling dust, irritant vapors, or tobacco smoke are common subjects of the disease. Alcoholism and gastric disturbances are causative agents in some instances.

A normal condition of the nasal passages and pharynx has much to do in maintaining a similar condition in the larynx. Any departure from the condition above will have a more or less deteriorating effect on the parts below. In chronic rhinitis or in naso-pharyngeal catarrh the secretion to some extent drops into the larynx, producing irritation and finally, with perhaps other factors, a chronic inflammation. In cases of stenosis requiring mouth breathing the air is not properly moistened or filtered and the larynx is exposed thereby to additional sources of irritation. Because of greater exposure males are more frequent subjects than females. The disease is most common in early adult and middle life.

PATHOLOGY.—There is thickening of the mucosa, with permanent dilation of the blood-vessels. The lymphoid tissue may be increased in long-standing cases. The disease may affect the whole or only a part of the larynx. Sometimes chronic laryngitis is confined chiefly to the arytenoid, the arytenoid commissure, and the ventricular bands. It may affect the cords and the infra-glottic region. Redness of the parts is not so bright as in the acute form.

SYMPTOMS.—The chief symptom and the one that usually

calls attention to morbid conditions is hoarseness. This varies widely in degree at different periods. It may be noticeable only after prolonged speaking and singing. In some cases the hoarseness present when the voice is first used wears away as speaking continues. Much effort is made by hemming and hawking to clear the throat of fancied secretion. The burning and tickling gives rise to cough usually spasmodic in character. There is a sense of constriction about the throat and often a feeling of the parts being tired; occasionally there is pain. Expectoration is scanty, unless the subglottic region is affected, when it is more abundant and of a yellowish color.

DIAGNOSIS.—The diagnosis rests on the above symptoms and the use of the laryngoscope. The picture presented in general is one of chronic inflammation of mucous membrane. Unusual changes may be seen in certain portions. The epiglottis may be found thickened and the false cords swollen to such a degree that the true cords are partly hidden. The interarytenoid space may be so edematous as to prevent complete closure of the cords. Some muco-pus may be present, and, in some instances, minute granulations on the cords and walls.

PROGNOSIS.—If the hearty co-operation of the patient is obtained much can be done to ameliorate the condition. It requires some time for a complete cure. Recovery in most instances is slow.

If the cause is due to nasal stenosis, removal of the obstruction will produce gratifying results. In cases of voice abuse the prognosis is good.

TREATMENT.—The treatment is largely local, especially when the cause is due to some local defect. If the disease is due to diathetic disturbances then the treatment should be directed to the cure of the general condition. If the disease has extended upward from the bronchi, treatment should be directed to them as well as to the larynx. If the cause exists above, then the treatment should be directed to its removal. Spurs, polypi, tumors, etc., should be removed.

Chronic rhinitis, or naso-pharyngeal catarrh, should receive proper attention. Whatever the condition it should be cured or, at least, palliated with the purpose of causing inspired air

to pass through its proper channels and of preventing the secretion from falling into the larynx.

If the use of the voice causes hoarseness and distress, then it is plain that its use should be interdicted. A majority of patients, however, come to the physician for relief, at the same time expecting to pursue their vocations. When exacerbations occur, ammonium chlorid in 10 grain doses may be given every two hours in order to increase the secretion lubricating the parts. The last dose is recommended to be taken at least three hours before the vocal exercise to prevent perspiration. At the same time warm alkaline sprays may be used. The fluid extract of collinsonia may be given, in doses of 10 to 20 minims, three or four times a day, for several weeks, to remove the hoarseness. For the muscular fatigue, strychnin, electricity or other tonics may be demanded.

For local treatment the spray is the mode chiefly used, either with the atomizer or nebulizer. In office work a large number of remedies have more or less repute. The larynx should first be cleansed by means of an alkaline solution similar to Dobell's. In cases of extreme tenderness or sensitiveness a 1 per cent solution of cocain may then be sprayed on the part. This may be followed by any one of the following solutions of astringents:

Protargol, 2 to 5 per cent.
Silver nitrate, 1 to 3 per cent.
Zinc sulpho-carbolate, 2 to 4 per cent.
Copper sulphate, 1 to 3 per cent.
Zinc chlorid, ½ to 1 per cent.
Alumnol, 1 to 3 per cent.
Tannic acid in glycerin, 2 to 5 per cent.
Tannic acid in water, 10 per cent.

The solution selected should be thrown into the larynx by compressed air or by the use of a double hand-ball atomizer every day or every second day. At the same time better results can be obtained if the patient will make use of an atomizer two or three times daily at home. Oil will prove more valuable than water as a menstruum. Such preparations as the following are largely used:

Menthol .....gr. 5
Thymol .....gr. 1½
Oil anise .....gr. 8
Liquid petrolatum .....oz. 1

Inhalations of medicated steam are soothing in cases of acute symptoms. The same drugs may be used in the same manner as described, under the treatment of acute laryngitis.

Stronger solutions may be used by the patient if a hand nebulizer is employed instead of an atomizer.

LARYNGITIS, SYPHILITIC.

ETIOLOGY.—In any form this is caused by the syphilitic virus. In the secondary form, the laryngeal lesions may appear in a period of two months to two years from the time of infection. Usually the period is much later than in other secondary manifestations. The tertiary lesions may appear in three to thirty years after the initial sore. Men are more frequently affected than women.

PATHOLOGY.—In addition to a laryngitis the secondary lesions are erythema, mucous patches, superficial ulcers and condylomata. The tertiary lesions appear as gumma, deep ulcers, and cicatricial stellate scars.

SYMPTOMS.—The first symptoms do not differ much from those of a simple acute laryngitis. There is hoarseness, with soreness and a tickling sensation. The pitch of the voice is lowered. When ulcers are present pains may be stabbing and severe in character. In extreme cases of ulceration, strangulation may occur and dysphagia be pronounced. The contractions taking place from ulceration may interfere with respiration, vocalization and deglutition.

On examination the reddened appearance soon becomes mottled. Mucous patches are found most frequently on the vocal cords. The ulcers are irregularly oval. Those of the tertiary stage will first be formed on the epiglottis and lastly in the infra-glottic region. They have regular punched-out edges, with perpendicular walls and a greenish gray bottom, and give rise to a foul-smelling discharge.

DIAGNOSIS.—It is important to distinguish syphilitic laryngitis from tuberculosis and malignant disease. The history of

infection will add much to the certainty of diagnosis. In tuberculosis, the pulmonary signs, the general symptoms, and the presence of tubercle bacilli in the sputum are sufficient for diagnosis.

In malignant tumors, there is the cachectic state and possibly paralysis of one or both vocal cords.

PROGNOSIS.—With proper treatment the prognosis is good if the disease is not far advanced.

TREATMENT.—The treatment is chiefly systemic. In the secondary stage the mercurials should be administered; in the tertiary, a preparation of the iodides. A mixed treatment, consisting of $^1/_{12}$ grain of bichlorid of mercury and 10 grains of iodid of potash, has been strongly advocated.

The local treatment consists of alkaline sprays and the application of a 10 per cent solution of silver nitrate. Iodoform and aristol may be used for insufflation. In severe cases it may be necessary to perform incision, dilation and intubation.

LARYNX, EDEMA OF THE; EDEMA OF THE GLOTTIS.

ETIOLOGY.—This condition may develop in the course of an acute laryngitis or complicate diphtheria, the exanthemata, erysipelas, cellulitis of the neck and typhoid or typhus fever. It may occur in chronic conditions of the larynx like tuberculosis and syphilis. The most frequent causes are probably the conditions that will produce edema in other parts of the body as cardiac weakness or some form of kidney disease.

PATHOLOGY.—In this disease there is transudation of serum into the submucous tissue, most marked in the ary-epiglottic region and posterior part of epiglottis. All parts of the larynx may be involved, but tumefaction of the cords and subglottic region is rare. It occurs most frequently during middle life.

SYMPTOMS.—As a rule, symptoms of stenosis develop rapidly. The voice becomes husky and is soon suppressed. Dyspnea is a prominent as well as distressing symptom. Inspiration is much more difficult than expiration, but the latter is also embarrassed. The patient complains of the sensation of a foreign body and may attempt its removal. The tumefaction of the

epiglottis and glottidean folds can be seen readily with the laryngeal mirror. The swollen epiglottis may often be seen by depression of the tongue or felt on examination with the finger.

DIAGNOSIS.—The diagnosis is made from the history of the case and the grayish white, translucent appearance of the swollen parts as revealed in the mirror.

PROGNOSIS.—The prognosis is grave. About 50 per cent of cases are fatal.

TREATMENT.—Efforts should be made to produce free catharsis and perspiration. If the heart is strong, pilocarpin $^1/_{12}$ to $\frac{1}{8}$ grain may be given hypodermically. Elaterium, croton oil, or a saturated solution of magnesium sulphate, may be given to produce free action of the bowels. If there is cardiac weakness, digitalis, strophanthus, strychnin or glonoin should be administered. Five grains of suprarenal extract placed on the back of the tongue in once instance afforded relief in a few minutes from its contracting effect on the small vessels. It is worthy of trial, as it will in no way interfere with other lines of treatment. A solution may also be used as a spray.

For the mild type of cases a blister applied to the larynx will afford relief. Ice may be kept in the mouth and ice bags or the Leiter on the throat. In severe cases several leeches may be applied over the region of the larynx. It may be necessary to puncture the swollen masses in several places. The operation may be repeated every three to five hours. This measure should not be too long delayed. If these methods of treatment are futile and suffocation appears imminent, recourse should be made to tracheotomy. Intubation will not answer, as much of the swelling would be above the end of the tube.

LEPRA; LEPROSY.

DEFINITION.—Leprosy is a constitutional, contagious disease caused by a specific microbe and characterized by nodular growths upon the skin, mutilation and disturbance of sensation.

VARIETIES.—There are two varieties—(1) Tubercular, attacking principally the skin, and (2) Anesthetic Leprosy, affecting chiefly the nerves. These forms may be, indeed usually are mixed, both occurring in the same individual.

ETIOLOGY.—Leprosy is contagious, but not intensely so. For instance, a husband afflicted with leprosy may not transmit the disease to his wife, although they live together for years. It seems to be hereditary in some cases. It is most common in the tropics, but may occur in any climate. Inoculation experiments upon animals have failed. The disease is caused by the bacillus lepræ, which resembles the tubercle bacillus.

PATHOLOGY.—The leprous nodules are found to consist of fibrous tissue containing cell-like masses and large numbers of the bacilli. According to one view these masses are epitheloid cells into which the bacilli have made their way; others believe them to be lymphatics which have been filled by the bacilli, causing coagulation of the lymph within these channels and proliferation of the lining endothelium. In the anesthetic form there is inflammation and fusiform swelling of the nerves. Numerous bacilli are also found here.

SYMPTOMS.—There is a long period of incubation and a series of prodromal symptoms, including malaise, loss of appetite, digestive disturbances, chills alternating with febrile attacks, pains in the bones, sensations of numbness, etc. The prodromes may precede the inception of the disease by weeks, months or years. According to Green, the period of incubation and prodromal period extend over nearly five years.

Tubercular Leprosy.—The face, hands, and, if the patient goes barefooted, the feet, are the portions of the body most affected. The disease usually appears as rounded, reddish macules, which soon become elevated and nodular, having a shiny appearance from the stretching of the epidermis over the masses which are situated in the corium. These are at first small but increase in size and coalesce, frequently forming walnut-sized nodules. Meanwhile they change in color to a yellowish or brownish hue. They are usually abundant about the eyebrows and forehead, causing a prominence of that part and throwing the skin into folds so as to give the face a leonine expression (leontiasis). These tubercules or nodules may be absorbed or ulcerate, in the latter case causing marked mutilation of the face or hands (lepra mutilans). The disease frequently attacks the mucous membranes of the eye, ear, mouth, nose and throat, and causes extensive destruction of the soft

parts in these localities. Infiltration of the larynx causes hoarseness and may threaten suffocation, requiring tracheotomy. The lymphatic glands are enlarged but do not suppurate. Nervous implication occurs later, but is found in practically all cases, the facial, median, ulnar, radial and peroneal being attacked. The internal organs often become degenerated and tuberculosis may complicate the case and cause death.

Anesthetic Leprosy.—This form is very slow in its onset and very chronic in its course. It is really a neuritis excited by the bacilli lepræ. The premonitory symptoms include hyperesthesia and neuralgic pains in addition to more or less constitutional disturbance. Bullæ may form, which rupture, leaving pigmented, anesthetic spots. The characteristic eruption follows, consisting of brownish or yellowish, non-elevated patches or macules, which gradually spread at the periphery, while healing at the center. These are at first slightly hyperesthetic, but finally become completely anesthetic. They are not at all symmetrical in location, but often appear upon the back and limbs. As the disease progresses trophic symptoms appear—the hair falls, the secretion of sweat diminishes, the nails become brittle and hard and the muscles are atrophied; finally the hands become distorted, the skin becomes ulcerated, necrosis of the members develop and the fingers and toes drop off (lepra mutilans). The orbicularis oris and the orbicularis palpebrarum may be paralyzed, while the atrophied facial muscles are drawn tightly over the bones of the face. The lymphatic glands are enlarged. This form is much more chronic than the first and may last for years. Spontaneous recovery may occur.

Diagnosis.—The disease has been confused with syphilis, morphea, vitiligo and lupus. In a well-marked case there should be no difficulty. In doubtful cases a microscopical examination, if carefully made, will settle the question.

Prognosis.—The disease is incurable and in practically all cases progresses to a fatal termination. It is, however, very chronic and may last for years. The anesthetic form is the slowest in its course, and according to Walker recovery is not uncommon. He, however, qualifies this statement by a quotation from Hansen to the effect that "recovery" refers to the

leprosy and that what is left is "only a miserable remnant of a human being."

TREATMENT.—Careful isolation of lepers is of great importance in order to prevent the spread of the disease. Treatment is for the most part unavailing. Though it may modify somewhat the course of the disease or ameliorate its symptoms, it is probably never curative. Many drugs have been recommended. Chaulmoogra oil has had quite a reputation. It is applied externally and taken internally (5 to 10 drops in capsules). Gurjun oil is also used both internally and externally. Arsenic, strychnin, sodium salicylate, ichthyol and hoang-nan have also been found useful internally, and externally, resorcin, pyrogallic acid, ichthyol, chrysarobin, etc. Woodson (Phila. Med. Jour.) has recently reported good results from the injection of Calmette's antivenene.

LEUKEMIA; LEUKOCYTHEMIA.

DEFINITION.—A disease characterized by an increase in the number of white corpuscles in the blood, by relative decrease of the red blood cells and enlargement of the spleen, bone-marrow and lymphatic glands.

ETIOLOGY.—The disease may occur at any age or in either sex, but is most common in adult males. Heredity sometimes seems to have a predisposing influence. There was a malarial history in 20 per cent of Gower's cases. Syphilis, pregnancy, stomatitis, ulceration of the stomach and injuries are said to be conditions favorable to its development. Several theories have been proposed to explain its appearance. That of Virchow and Neuman is that it is due to a hyperplasia of the lymphoid cells of the blood-making tissues, analogous to that which takes place in tumor growth. Another theory is that it is caused by a prolongation of the life of the white cells with a consequent accumulation in the blood and glands. The third, proposed by Klebs, ascribes it to the irritation of microörganisms. The first and last are the most popular.

PATHOLOGY.—The morbid changes are most apparent in the spleen, bone-marrow and lymph glands; any or all of these may be affected. The spleen is usually enlarged, sometimes enormously, and may weigh from two to eighteen pounds. At first

it is soft and pulpy, but later in the course of the disease becomes hard and resistant. The cut surface is reddish-brown, often showing hemorrhagic patches. There is pronounced hyperplasia of the cellular elements. The fat of the bone-marrow is replaced by the multiplying lymph cells and nucleated red corpuscles. In the lymphatic form of the disease the glands are enlarged, sometimes groups and sometimes the entire glandular system being involved. Histological examination shows hyperplasia of the lymphoid cells. The liver is often greatly increased in size and infiltrated with leukocytes.

SYMPTOMS.—The onset of the disease is insidious, the early symptoms being those of an ordinary anemia, viz., pallor of the skin, loss of appetite, indigestion, languor, weariness on exertion, cardiac palpitation, dizziness, and fainting attacks. Loss of flesh ultimately follows. There is usually more or less elevation of temperature, which becomes more marked as the case progresses. The pulse is rapid, soft and compressible. Headache, vertigo and syncope increase with the anemia, which is usually marked. Various hemorrhages complicate the condition; there may be nose-bleed, vomiting of blood or hemorrhage from the bowels or into the skin (purpura hemorrhagica). Cerebral hemorrhage may produce an apoplectic attack and cause death. There is often nausea and vomiting. Late in the disease edema of the limbs appears. Priapism is occasionally a troublesome symptom. The urine is highly colored and scanty and often contains a small quantity of albumin.

The enlargement of the spleen may first attract the patient's attention. In the most marked in the spleno-medullary form of the disease (the most common form), in which the organ on account of its great size may compress the surrounding viscera and cause digestive derangement or embarrass cardiac or respiratory action. It makes a tumor-like mass below the ribs, which is easily felt and on percussion gives a dull note. It is not especially tender. There may be some tenderness upon percussion over the sternum and long bones.

The blood changes are most important and determine the diagnosis of the disease. The most characteristic feature is the enormous increase in the number of leukocytes. Normally there are of these from 6,000 to 8,000 per cubic millimeter, or

one to 500 of the red blood corpuscles; in this disease there are from 50,000 to 500,000 leukocytes per cubic millimeter, or one to every 150 or less of the red cells. Cases have been reported where the number of white cells equalled or exceeded the number of red blood corpuscles.

In the *spleno-medullary form* there is a slight reduction of red blood corpuscles, many of which are nucleated, and the quantity of hemoglobin is also diminished in somewhat larger proportion. The number of leukocytes is enormously increased. A large proportion of these (20 to 50 per cent) are myelocytes (marrow-cells). There is a corresponding decrease in the lymphocytes.

In the *lymphatic form* there is a more marked reduction in the number of red blood cells, but the nucleated ones are generally absent. Of the white corpuscles the lymphocytes predominate, being increased from a normal 15 to 30 per cent to 90 to 97 per cent, other forms being proportionately reduced. Myelocytes are not present. Leukocytosis is not so marked as in the spleno-medullary form. Lymphatic leukemia is much less common but much more rapidly fatal than the spleno-medullary form of the disease.

DIAGNOSIS.—This must be determined in most cases by a careful study of the blood.

PROGNOSIS.—The disease is almost inevitably fatal, although periods of temporary improvement often give promise of permanent benefit or cure. Recoveries do sometimes occur, but very rarely. The average course of the disease is two or three years. In the lymphatic form death is likely to take place in as many weeks or months.

TREATMENT.—The treatment should be largely hygienic. If the symptoms are aggravated rest in bed may be advisable, but where possible the patient should lead a simple, outdoor life, in an equable climate, avoiding care or excitement.

Of medicines arsenic gives the best results. It should be given in gradually increasing doses, in the form of Fowler's solution, until the point of physiological tolerance is reached. It should be used continuously in spite of apparent improvement. Quinin may be tried if there is malaria. Glycerin extract of bone-marrow (teaspoonful three or four times daily)

has also been found useful and should be given where arsenic is not well borne. Or bone-marrow may be administered with arsenic or iron with good results. Oxygen inhalations have been found beneficial in some cases. Electricity may contribute something to the patient's comfort.

LEUKODERMA—See Vitiligo.

LEUKORRHEA.

DEFINITION.—A mucous or muco-purulent discharge from the female genitals; the "whites."

ETIOLOGY.—Leukorrhea is symptomatic of many disorders of the female sexual organs, such as vulvitis, vaginitis, cervical or uterine endometritis. It may be the result of local irritation or infection, produced by masturbation, by worms and other foreign bodies, by excessive coitus, unclean discharges or gonorrhea; also of the pelvic congestion caused by constipation, pregnancy, uterine displacements, the pressure of tumors and hepatic or cardiac diseases. It frequently occurs in plethoric and anemic women and in the course of severe debilitating diseases. Fatigue and lactation are favorable to its production, and it is said to occur most frequently in cold moist climates.

SYMPTOMS.—*Vulvar leukorrhea* presents the cardinal symptoms of inflammation as seen elsewhere. The external parts become red, swollen, painful and covered with an irritating mucous or purulent discharge; the discomfort is increased by walking or contact with urine. Gonorrhea is the most common cause. The vulvo-vaginal glands may become infected; this is followed by great swelling of the labium majus and the formation of an abscess.

Vaginal leukorrhea is characterized by a sense of pelvic fullness, heat and dull backache. Frequently there is irritability of the bladder, loss of appetite and slight feverishness. It is often due to gonorrhea, the discharge then being profuse and yellow or greenish-yellow in color. Uninfected cases present a glairy, whitish mucous discharge. The vaginal secretion is acid and contains flat, vaginal epithelium.

Uterine leukorrhea may be caused by a cervical or corporeal endometritis. In the former condition the constitutional symp-

toms are less pronounced, the most marked evidence of the disease being found in the profuse secretion of thick, whitish, tenacious mucus. If the discharge comes from the latter locality the secretion is less abundant, is thinner, often purulent and mixed with blood. There is a dragging pain in the pelvis, severe and persistent headache, the patient tires easily when on her feet and there are often pronounced nervous symptoms. The discharge is alkaline and contains columnar epithelium, which is ciliated if it is from the body of the womb.

PROGNOSIS.—Depends upon the cause. Gonorrheal infections are extremely likely to spread to the Fallopian tubes, causing a permanent invalidism which is often only relieved by operation.

TREATMENT.—In leukorrhea occurring in debilitated, anemic women a cure may often be made by general treatment alone. In these cases it is of primary importance to build up the general health. Frequently relief is found by stopping the exhausting drain of prolonged lactation or by securing rest from physical overwork or nervous strain. Good food, moderate exercise in the open air, massage, baths, etc., are all important means of treatment. The dress should be made so as not to compress the pelvic organs or drag heavily upon the abdomen. Anemia is an indication for the administration of iron. The peptomanganate of iron is an agreeable and efficacious preparation. Blaud's pill is also an excellent remedy. Strychnin and other tonic drugs may also be used if indicated.

Tinct. nux vomica.....dr. 3
Sol. iron peptomanganate.....oz. 4
Dessertspoonful three times a day.

Ferrous carbonate mass (Blaud).....gr. 5
Arsenous acid .....gr. $^1/_{50}$
Ext. nux vomica.....gr. $\frac{1}{4}$
One pill. To be taken three times a day.

Goodell's "four chlorids" is useful, but its use should not be prolonged. It contains:

Mercury bichlorid .....gr. 1—2
Sol. arsenic chlorid.....gtt. 48
Tinct. iron chlorid.....dr. 4
Dil. hydrochloric acid.....dr. 4
Water, enough to make.....oz. 6
Dessertspoonful in a wine glass full of water after meals.

If there is constipation, cascara sagrada or a mild laxative "anti-constipation" pill may be given as needed. Plethoric women do best upon salines, including the natural mineral waters, or Carlsbad, Epsom or Rochelle salts. These are also indicated if there is pelvic congestion, unless there is decided anemia.

As nutrients and tonics cod-liver oil, hypophosphites and maltine are especially valuable in neurasthenic patients. They may be variously combined with iron, cascara, etc., according to the nature of the case.

Local treatment varies according to the part of the genital tract affected and the cause of the inflammation. Vulvitis is treated with warm boric acid lotions, separating the labia with absorbent cotton, and rest. If there is gonorrhea, after thorough cleansing, the parts should be painted with silver nitrate solution (5 to 10 grains to the ounce).

Vaginal leukorrheas are usually treated by astringent injections. The simplest are solutions of boric acid, sodium bicarbonate or borax (dram to the pint). If the symptoms are acute these should be given hot (110° F.), with the patient lying on her back. Various formulas have been suggested which will be found useful in subacute and chronic types.

Alum ..... dr. 1
Zinc sulphate ..... dr. ½
Borax ..... gr. 4
Rose water ..... oz. 8

Injection.—Bartholow.

Tannic acid ..... oz. 4
Glycerin ..... oz. 16

Tablespoonful to a quart of tepid water as injection night and morning.

Zinc sulphate ..... dr. 1½
Alum ..... dr. 1½
Glycerin ..... oz. 6

Tablespoonful to a quart of hot water as an injection.—T. Gaillard Thomas.

Sodium bicarbonate ..... dr. 1
Tinct. belladonna ..... dr. 2
Water ..... pint 1

Use as a vaginal wash.

If the discharge is offensive potassium permanganate (20 to 30 grains to the pint) should be used. In the vulvitis or leucorrhea of young girls Shoemaker recommends lotions or injections of carbolic acid solution (5 to 1,000). The fluid extract of hydrastis is another useful topical application, in the strength of one dram to the pint. An infusion of white oak bark is a popular remedy, deriving its efficiency from the tannic acid which it contains.

Gonorrheal vaginitis requires more vigorous treatment with active antiseptics. Hot douches of bichlorid solution (1 to 5,000) may be given during the more acute stages. As soon as the symptoms begin to subside and the discharge is more profuse, the inflamed vaginal surface should be painted with silver nitrate solution (10 to 20 grains to the ounce). This is applied through a speculum, usually with a swab. Hirst (Ther. Gazette) prefers the following method: A cylindrical speculum is inserted and filled full of the solution, then slowly withdrawn. This brings it in contact with every portion of the vagina. When the leukorrhea, whatever its cause, shows a tendency to linger, frequent applications of silver nitrate are useful. Penrose prefers to paint the vaginal surface daily with bichlorid solution (1 to 1,000).

A unique method of treatment used by Landau of Berlin and which proved effective even in obstinate cases of gonorrheal leucorrhea consisted in injections of brewer's yeast, somewhat diluted and retained with a cotton tampon for twenty-four hours, when the vagina was douched. Mitchell (Woman's Med. Jour.) used it with fair results. Compressed yeast may be used as a substitute.

Cervical leukorrhea is, as a rule, the most profuse. In this form astringent injections are less useful. The discharge both in this form and the corporeal form is generally due to endometritis. The rational treatment is therefore curettement. Much, however, can be done to relieve the symptoms by local measures. One of the most valuable, if properly taken, is the hot douche. To be of real benefit, the water must be as warm as can be comfortably borne (110° to 120° F.); a large quantity of water must be used and allowed to run slowly, at least three gallons, which should take 15 to 20 minutes; and it must be used while

the patient reclines. An apparatus can be improvised by placing boards between chairs and putting a wash-tub beneath to catch the water.

The vaginal vault may be painted with Churchill's tincture of iodin, and glycerin tampons applied to the cervix. These may be variously medicated; boroglycerid (25 per cent) and ichthyol and glycerin (10 per cent) are favorite applications. Goelet prefers:

Iodin .....dr. 1
Glycerin .....oz. 4

Instead of the cotton or wool tampon, when the parts are tender and sensitive, Goelet advises the use of strips of gauze soaked in glycerin. These may be loosely packed around the cervix.

To the cervical canal more severe remedies may be applied, as solutions of silver nitrate, zinc chlorid (1 to 2 grains to the ounce), Churchill's tincture, or caustics like pure carbolic acid or the following:

Carbolic acid .....dr. 2
Tincture iodin .....dr. 4

When the discharge is from the body of the womb, little can be expected from local treatment, though temporary relief may be obtained from the hot douches, tampons and applications to the vaginal vault. Swabbing out the interior of the uterus with Churchill's tincture or the carbolic acid-iodin solution is sometimes of value. Protargol bougies may be tried.

LICE—See Pediculosis.

LITHEMIA—See Gout.

LIVER, CIRRHOSIS OF THE; HEPATIC CIRRHOSIS;

DEFINITION.—A disease of the liver characterized by an increase of the connective tissue and destruction of the secreting cells.

VARIETIES.—(1) Atrophic; (2) hypertrophic; (3) biliary.

ETIOLOGY.—Atrophic cirrhosis is produced in the great majority of cases by the excessive use of alcohol, especially in its concentrated forms, as whisky, brandy, gin or pure spirits.

It is sometimes called "gin-drinker's liver." It occurs most frequently in males and during middle life. Certain chronic diseases are predisposing factors; among these are long-continued malaria, syphilis, rickets, gout, diabetes, tuberculosis and carcinoma. A variety of the disease known as fatty cirrhosis is said to be produced by the abuse of malt liquors. The etiology of the hypertrophic forms is obscure.

PATHOLOGY.—The liver is usually greatly decreased in size, although there may be a preceding hypertrophy. When the case comes to autopsy the organ, which normally weighs five or six pounds, may weigh but two or three. Its surface is irregular or lobulated; this gives the disease a name—"hob-nailed" liver. It is extremely hard and resistant and is cut with difficulty. Microscopic examination shows a great increase in the amount of connective tissue, which is especially abundant around the lobules and interlobular veins. By the contraction of this connective tissue the branches of the portal veins are subjected to great pressure and partially obliterated; this produces engorgement of the entire portal system and subsequent abdominal dropsy. These veins seem to suffer most of any of the structures contained in the liver, but nevertheless many liver-cells are destroyed by the encroaching connective tissue which replaces them. The irregular "hob-nailed" surface is also due to this tissue, which is attached to the capsule and in contracting draws it into characteristic rounded prominences. Sometimes in alcoholic cirrhosis instead of being contracted the liver is enlarged, smooth or slightly granular, soft and of a light yellow color due to fatty infiltration. This is known as fatty cirrhosis.

In hypertrophic cirrhosis the liver is greatly enlarged, often weighing eight or ten pounds. It presents a greenish-yellow color lighter than in health. There is a great over-growth of connective tissue around the lobules, which, however, shows no tendency to contract. In this form the portal veins do not suffer, but there is obstruction of the biliary ducts; this causes jaundice, retention of the bile and atrophy of the cells. French authors describe a form of hypertrophic cirrhosis which they call "biliary cirrhosis." This is a result of obstructive disease

of the bile passages. Cellular necrosis and proliferation of connective tissue follows the retention of bile.

SYMPTOMS.—*Atrophic Cirrhosis.*—The disease may exist for a long time without producing subjective symptoms aside from those of the gastro-intestinal catarrh which is usually associated with it, especially if the patient uses alcohol in excess. These include loss of appetite, a coated tongue, foul breath, flatulence, constipation and frequently morning vomiting. Anemia develops early and there is loss of weight, which becomes more marked as the disease progresses. Jaundice is present in only 25 per cent of the cases and is usually slight, but there is generally a sallow cast of the skin, which is also dry and harsh. The bowels are usually constipated and the feces light colored.

The obstruction of the portal circulation produces the most characteristic symptoms. These are the gastric catarrh (which see) and hemorrhages from the nose, stomach and bowels. The amount of blood lost may be considerable, but is seldom sufficient to be a source of danger to life.

Ascites, or abdominal dropsy, occurs as a late symptom in most cases. The amount of fluid is often enormous. Edema of the limbs is much more rare and is due to the pressure of the ascitic fluid upon the veins coming from the lower extremities.

The superficial veins of the abdomen are often greatly distended; this is due to the establishment through them of a collateral circulation. The enlarged veins surrounding the umbilicus are called the *caput medusæ.* Hemorrhoids are produced by the portal stasis, causing overdistension of the hemorrhoidal veins.

Fever is not a constant symptom, but is usually present in the latter stages of the disease. It is irregular, intermittent and seldom exceeds 101° or 102° F.

The urine is scanty, concentrated, high-colored, sometimes blood-stained, contains an excess of urates, a little albumin and sometimes bile. Urea is diminished. Nervous symptoms as restlessness and insomnia are frequently present. At any time the patient may be attacked with severe headache, delirium, stupor and coma, terminating in death.

Physical examination shows a characteristic emaciation of

body and limbs, prominence of the superficial veins and generally abdominal enlargement from an accumulation of ascitic fluid. At first the liver may be slightly enlarged, but it is usually found to be diminished in size, as felt beneath the margin of the ribs. Percussion shows that the vertical diameter, normally reaching from the sixth interspace to the costal margin a distance of four inches, has been reduced by half or even more. The spleen is enlarged.

Hypertrophic Cirrhosis.—This form of cirrhosis affects young adults most frequently. The onset is often slow and insidious, marked only by digestive disturbances and slight jaundice, which is, however, constant and persistent. There is also pallor of the skin and leukocytosis. Hemorrhages from the stomach and bowels are usually rare, but there are frequently cutaneous hemorrhages (purpura hemorrhagica). Ascites is nearly always absent. The urine is scanty, generally stained with bile pigments, contains a normal amount of urea, is never blood-stained and is sometimes albuminous and contains casts. The feces are sometimes free from bile and sometimes deeply colored. The appetite which was at first lost may return. Emaciation is, however, marked. Features of this form are recurring attacks, during which there is pain like that produced by hepatic colic, intense jaundice, tenderness over the liver and high fever. The course of the disease is rapid and it terminates with delirium, associated with marked elevation of temperature and coma.

Physical examination shows the liver to be tender and greatly enlarged, sometimes reaching to the umbilicus. The spleen is also much enlarged.

Diagnosis.—The diagnosis of *Atrophic Cirrhosis* rests principally upon the following facts: (1) The liver is usually (not always) decreased in size, while the spleen is enlarged; (2) there is progressive emaciation, with sharpened features and a sallow skin; (3) gastro-intestinal symptoms are prominent and there may be hemorrhage; (4) the urine contains an excess of urates and a diminished quantity of urea; (5) ascites is present, according to Adami, in only about 50 per cent of the cases. When absent it makes the diagnosis more difficult.

Chronic tubercular peritonitis may be distinguished from atrophic cirrhosis by the fact that in the former disease there

is characteristic abdominal tenderness, fever, and a smaller quantity of dropsical fluid. Liver dulness is normal, gastro-intestinal hemorrhages are rare, stools are not clay colored, as in cirrhosis, and the ascitic fluid is often tinged with blood.

Hypertrophic Cirrhosis may be distinguished from cancer by its occurrence at an earlier age, the absence of cachexia, pain occurring in paroxysms, uniform enlargement and extremely chronic course.

In abscess of the liver there is usually a history of dysentery, pyemia or injury; pain is severe and constant; there are chills, fever and sweating; the course is short; pus is found upon aspiration.

In hydatid cyst of the liver there is no pain, fever, jaundice or emaciation; aspiration brings away the characteristic fluid.

The following table will assist in the differential diagnosis between the two common forms of cirrhosis:

ATROPHIC CIRRHOSIS.	HYPERTROPHIC CIRRHOSIS.
Occurs most frequently in adult males over 40.	Occurs most frequently in young adults, males, between 20 and 35.
Liver is generally atrophied; spleen enlarged.	Liver greatly enlarged; spleen enlarged.
Jaundice not a constant symptom.	Jaundice constant and well marked.
Hemorrhage from stomach and bowel common.	Hemorrhage from stomach and bowel rare; cutaneous hemorrhage common.
Pain and tenderness slight or absent.	Tenderness of liver and recurring attacks of severe pain.
Ascites usually present and often very great.	Ascites usually absent except at close of disease and then not great.
Appetite poor.	Appetite often good.
Urine contains excess of urates, diminished urea, little or no bile, sometimes blood.	Urine contains normal urea, no marked excess urates, bile constant, blood always absent.
Duration 2 or 3 years.	Duration 5 to 10 years.

PROGNOSIS.—The disease may exist a number of years, but the prognosis is always unfavorable, although the symptoms may abate and life be much prolonged under appropriate treatment.

The average duration of life is one to three years. In the hypertrophic form the expectancy is greater.

TREATMENT.—In order to obtain good results in the treatment of cirrhosis of the liver it is necessary to reach the cause. The use of alcoholic drinks must be stopped entirely. If there is syphilis, mercury and potassium iodid must be administered in large doses. Malaria requires the use of quinin and arsenic and removal to an unaffected locality if this be possible. Rickety children should be given good nutrition and suitable medicinal treatment—and so on with all the predisposing diseases.

The character of the food is of great importance. An excess of meat, lean or fat, is injurious because the crippled liver is unable to properly dispose of the proteids and the biliary secretion is insufficient for the digestion of the fats. Highly seasoned foods are distinctly irritant to the already congested liver. Sweets are likely to undergo fermentation, increasing the digestive disturbance and producing intestinal auto-toxemia and still farther aggravating the hepatic congestion. The best food is milk, and when the patient's digestion will permit, a pure milk diet is by all means most satisfactory. The addition of Vichy, Apollinaris or a carbonated water will make it more agreeable to the patient in many instances, especially if there is a tendency to nausea. Buttermilk or koumiss is more satisfactory in some cases. Milk not only produces no gastric irritation but it supplies all necessary food and is an excellent diuretic. Luzzato (Medical Record) has reported a case of alcoholic cirrhosis in which there was marked ascites and beginning pulmonary edema, which was apparently cured by a milk diet. Dabney suggests that patients often take "mush and milk" with great relish who would not take milk alone. If the digestion is good, other forms of food may be added. Usually fruits and vegetables may be taken in moderate quantities and stale bread, dry or milk toast, the breakfast cereals, soft cooked or raw eggs and the white meat of chickens.

An outdoor life and moderate exercise are to be recommended in all but the most severe cases. Where there is decided physical weakness, however, temporary rest in bed with massage may be required. Flannel should be worn next the skin. The func-

tion of the skin should be kept active. Recommend a hot tub or vapor bath or, if the patient is sufficiently strong, a Turkish bath, once or twice a week. The cold shower with vigorous friction should be taken every morning.

There are two ways by which the venous engorgement of the portal system may be relieved: (1) By preventing obstruction within the liver; (2) by draining the distended portal veins of fluid. The first is unfortunately impossible in most cases. Proper diet and hygiene, as already described, may prevent further increase in the amount of connective tissue. To promote its absorption, potassium iodid is usually given as a routine measure; 10 to 20 grains are to be taken three or four times a day. It is doubtful if it has any decided effect upon the interstitial growth, but it is an excellent diuretic and its good results may in part be attributable to this fact. Mercury and arsenic are also given to arrest the degenerative change.

Bruce recommends the following as worthy of trial:

Fowler's solution	m. 3
Iron tartrate	gr. 5
Potassium bicarbonate	gr. 10
Chloroform water	dr. 4
Distilled water, enough to make	oz. 1

This quantity to be taken three times a day, immediately after meals.

The second indication, distention of the portal vessels, is often met by the hemorrhages into the stomach and bowels; these sometimes give decided relief. On this account venesection has been recommended in this condition and is still considered rational by some authors. The usual method of treatment, however, consists in the free use of saline cathartics to be taken every morning. Carlsbad, Epsom and Rochelle salts or the natural mineral waters are suitable for this purpose. Patients often receive decided benefit from a course of treatment at the European spas. Calomel and blue mass are often used, and in some cases hydrogogue cathartics are beneficial, such as compound jalap powder in teaspoonful doses or elaterium ($^1/_6$ grain every four hours until free catharsis). Diuretics are also of service. Digitalis and squills are much used and may be combined with mercury, as in the following:

Calomel .....gr. 1
Powd. digitalis .....gr. 1
Powd. squills .....gr. 3
To be taken four times a day.

Acetate, citrate and nitrate of potassium are also worthy of trial, but the diuretic of most value is probably copaiba; 5 grains of the balsam should be taken three times a day.

Plicquet (La Presse Med.) recommends the following diuretic mixture:

Juniper berries .....dr. 2½
Make an infusion with 4 ounces of boiling water and add—
Potassium nitrate .....dr. ½
Potassium acetate .....dr. ½
Oxymel of squill.....oz. 2
Syrup .....oz. 1
This quantity to be taken every twenty-four to forty-eight hours.

Bruce recommends in advanced cases:

Tinct. digitalis .....m. 10
Fl. ext. squills.....m. 4
Potassium acetate .....gr. 20
Potassium iodid .....gr. 5
Distilled water, enough to make.....oz. 1
To be taken four times a day.

Eventually the accumulation of fluid in the abdomen makes it necessary to "tap," in most cases. The operation of paracentesis abdominis is performed as follows: After emptying the bladder, the skin in the median line about three inches above the symphysis pubis is anesthetized with the ethyl chlorid spray. The patient should be in a sitting position, leaning slightly forward, or, if this is impossible, semi-reclining. The trocar is now quickly driven through the abdominal wall and withdrawn, leaving the canula in place. The abdomen should be surrounded by a binder which is tightened gradually as the fluid is evacuated. The wound should be covered with antiseptic gauze and sealed with collodion. Following this operation the diuretics are often much more active than before.

The gastric complications of hepatic cirrhosis are those of catarrh of the stomach and should be treated accordingly. Lavage is of decided benefit when there is an accumulation of stagnating and fermenting food and for the relief of nausea.

Ordinarily the gastric sedatives, cerium oxalate, creosote, bismuth, small doses of calomel or chloroform water will relieve the nausea. Small pieces of ice are often effective.

Flatulence is relieved by the intestinal antiseptics, salol, benzo-naphthol and the sulphocarbolates. Hemorrhage is rarely severe enough to be a cause of alarm. Usually rest in bed and the internal or hypodermic use of morphin or opium are all that is necessary. Magnesium sulphate in solution with aromatic sulphuric acid and perhaps alum may be tried in severe cases. Ergot and gallic and tannic acids are also recommended.

LIVER, CONGESTION OF THE.

DEFINITION.—An increased quantity of blood in the liver. It may be either (a) *active,* in which there is an excess of arterial blood; or (b) *passive,* with an excess of venous blood. The latter is more common.

ACTIVE CONGESTION OF THE LIVER.

ETIOLOGY.—An increased flow of blood to the liver is physiological after a full meal. The condition may be produced by cold, overeating, by highly spiced or overseasoned food and by indulgence in spirituous or malt liquors, especially when these habits are associated with a sedentary life and insufficient exercise. Injuries, suppression of menstruation or of other hemorrhages, gout, rickets and some of the acute infectious diseases, such as malaria, yellow fever and typhoid fever, may produce it.

SYMPTOMS.—The symptoms are generally referred to the gastro-intestinal tract and are often characterized by the term "biliousness." There is a sallow skin, loss of appetite, a coated tongue, foulness of the breath, a bad taste in the mouth, nausea and sometimes vomiting (often of "bilious" matter) and constipation. Or there may be diarrhea, the stools being darkened by bile and voided with considerable tenesmus. The patient complains of dull headache, vertigo and mental hebetude. The liver is enlarged and there is slight pain and tenderness in the hepatic region, most apparent after eating. Hemorrhoids may be produced. The urine is scanty and rich in urates.

PROGNOSIS.—Good. Complete recovery follows correction of faulty habits.

TREATMENT.—During an acute attack of congestion of the liver the patient should be put to bed and given a liquid diet. Indiscretions of diet which produce the condition should be stopped. Rich foods, pickles, spices, candies, sweets and pastries are to be avoided and alcoholic drinks of all kinds given up entirely or used only in moderation. Milk, buttermilk, koumiss, eggs, fish, lean meats in moderation, and fresh fruits and vegetables are the most appropriate articles of food. After the acute stage has subsided plenty of active exercise in the open air will have a decided effect for good.

Fermenting or decomposing food in the stomach and bowels must be removed and the parts put at rest. Washing out the stomach may be practised with benefit if there is gastric disturbance. If there is nausea the best laxative is calomel given in small doses ($\frac{1}{4}$—$\frac{1}{2}$ grain every hour). The following is useful under these circumstances:

Calomel .....gr. 3
Powd. ipecac .....gr. 1
Bismuth subnitrate .....dr. $\frac{1}{2}$

Make 12 powders. One powder every hour until the bowels move or 5 or 6 doses are taken. Follow with saline.

If there is much fermentation and distention of the bowels with gas the intestinal antiseptics should be used. Salol, sodium or zinc sulphocarbolate (the latter if there is diarrhea), bismuth salicylate and beta- and benzo-naphthol are satisfactory drugs of this class. W. B. Stewart recommends the following:

Calomel .....gr. 4
Podophyllin .....gr. $\frac{1}{2}$
Zinc sulphocarbolate .....gr. $1\frac{1}{2}$

Make 3 powders. One at 6 P. M., one on retiring and if necessary the third powder in the morning.

The "blue pill" is an old and favorite remedy for torpid liver; 5 to 10 grains may be taken at bedtime, followed by a saline cathartic the following morning—as Epsom or Rochelle salts or a natural aperient water. The natural purgative mineral waters or saline laxatives are usually most beneficial in this condition. They not only relieve the bowel of offending substances but deplete the engorged liver. A daily morning dose of Apenta, Carlsbad, Rubinat, Hunyadi, or Friedrichshall water, or of Carlsbad, Epsom, or Rochelle salts, will meet the con-

ditions. A teaspoonful of the effervescing phosphate of sodium three times a day is also extremely effective in these cases.

Salines are not suited to habitual use except in the plethoric. To keep the bowels open and prevent recurrence other laxatives are better in most cases. The blue pill succeeds best in some cases, especially in those of a "bilious" temperament. Hartshorne recommends the following:

Mass mercury	gr. 5
Powd. rhubarb	dr. ½
Ext. gentian	dr. ½
Oil cloves	gtt. 4

Make 20 pills. One or two occasionally as directed. May be continued, if required, several times a day for several days.

Cascara sagrada, podophyllin, aloes, euonymus, etc., are useful in habitual constipation with a tendency to recurring attacks of congestion of the liver. The aloin, strychnin and belladonna pill is a useful combination. If the stomach is out of order, shown by fermentation of food and flatulence, hydrochloric acid and nux vomica are useful. The following is a good combination:

Tinct. nux vomica	dr. 4
Fl. ext. cascara sagrada	oz. 1
Dil. hydrochloric acid	dr. 4
Syrup ginger	oz. 2
Simple elixir, enough to make	oz. 6

Dessertspoonful in water one-half hour after each meal, taken through a glass tube.

Local applications to the region of the liver sometimes ameliorate the symptoms. A large mustard plaster, hot turpentine stupes, or hot wet compresses are useful. Cupping, blisters, or leeches may be tried if these fail. In cases showing a tendency to persistence painting the skin with tincture of iodin is helpful.

PASSIVE CONGESTION OF THE LIVER.

ETIOLOGY.—The disease is produced by any cause which hinders the free escape of venous blood from the liver. The most common is valvular or degenerative disease of the heart with failing compensation. It may also be caused by diseases of the lungs, as emphysema or cirrhosis, or by pressure upon the vena

cava by pleural effusion or a tumor. Disease of the walls of the veins may produce it. Predisposing causes are alcoholism, syphilis, malaria, gout, and tuberculosis.

PATHOLOGY.—The liver is enlarged, firm, dark red in color and its outer surface smooth. The cut surface has a mottled appearance, which gives it the name of "nutmeg liver." This is due to dilation of the intralobular veins, so that the center of each lobule is of a darker color than its periphery, which is pale owing to fatty infiltration. In later stages of the disease the organ becomes atrophied, or diminished in size, on account of contraction of the connective tissue, which is increased in quantity.

SYMPTOMS.—To the symptoms of the causative trouble, usually heart disease, are added those of impaired liver function. There is an associated venous stasis of the mucous membrane of the stomach and intestines, producing indigestion, flatulence, nausea, and other evidences of gastric catarrh, and constipation. Headache, mental torpidity, vertigo and slight jaundice are caused by the retention of waste products in the blood.

The local symptoms are a sense of weight and fulness in the hepatic region and slight pain and tenderness upon pressure. The organ is greatly enlarged and may reach as low in the abdomen as the umbilicus. Sometimes pulsation may be detected; this is produced by the regurgitation of the blood into the hepatic veins from the impulse of the right heart. Ascites, or abdominal dropsy, is a complication that appears in advanced cases on account of the damming back of the blood into the portal system. Hemorrhoids are produced, in a similar manner, by portal engorgement.

PROGNOSIS.—The prognosis depends entirely upon the cause.

TREATMENT.—The treatment should be addressed mainly to the causative condition. In most cases digitalis is indicated and its use in full doses (10 to 15 drops of the tincture three or four times daily) is followed by rapid improvement. Sparteín, strophanthus, caffein and squills are also useful.

Heart tonics act by raising the arterial blood pressure; an effort should also be made to lower the venous pressure, thereby assisting in restoring the balance of the circulation. This is accomplished by the use of cathartics. The salines and purga-

tive aperient waters taken before breakfast meet this end. Blue mass or calomel will sometimes give the best results. Where ascites is present the more powerful hydrogogue cathartics may be required, such as elaterium ($^1/_6$ grain every three hours until the desired effect is produced) or compound jalap powder (a teaspoonful in the morning).

Local treatment by leeches, blisters or counter-irritants may be found advisable.

LOCK-JAW—See Tetanus.

LOCOMOTOR ATAXIA; TABES DORSALIS.

DEFINITION.—A degenerative disease of the posterior or sensory portion of the spinal cord, characterized by an ataxic gait, disturbed sensation and nutrition, and neuralgic pains

ETIOLOGY.—Locomotor ataxia occurs ten times as often in men as in women. It is a disease of adult life, most of the cases appearing between the ages of thirty and fifty. Negroes are usually exempt. Syphilis is generally conceded to be the most common cause; a history of specific disease is found according to various observers in from 50 to 90 per cent of cases. Möbius and others assert that syphilis is always present, but this position is not supported by the facts. It is probable that there is a toxic element, as yet unknown, which becomes active in the presence of debilitating neuropathic conditions. Exposure to cold and wet, injuries, physical, mental and sexual excesses and alcoholism are believed to be responsible for the production of the disease in some cases.

PATHOLOGY.—The pathological changes are found in the posterior or sensory portion of the cord. The cord is flattened from before backward, the membranes over the affected area are thickened and adherent and the nerve tissues shrunken. The course of the degenerated portion can often be recognized as grayish areas caused by the destruction of the nerve cells and their replacement by connective tissue. The lumbar portion of the cord is most often affected. The disease is now known to commence in the ganglia of the posterior roots which send trophic fibres to the periphery in one direction and the posterior portion of the cord in the other; both undergo degenerative

changes, causing at one end a peripheral neuritis, on the other a central spinal sclerosis. The initial lesion in the cord is in the Spitzka-Lissauer tract. The columns of Burdach, Clarke and Goll are next involved. The disease process ascends into the dorsal and cervical regions and may involve the cerebral ganglia.

Symptoms.—The symptoms of locomotor ataxia are usually described as belonging to the following classes: (1) Motor, (2) sensory, (3) reflex, (4) visceral, and (5) those of the special senses. It should be remembered, however, that only centers of sensation in the cord are affected and that motor manifestations are secondary—there is no loss of muscular power. For convenience, the symptoms will be given as nearly as possible in the order in which they appear.

Preataxic Stage.—The patient may complain for some years of occasional pains in the limbs, sensations of numbness or tingling of the skin, transient ocular disturbances and sexual weakness, or, rarely, increased sexual power. These symptoms gradually increase in severity until the so-called "lightning-pains" develop. These are severe, sharp, shooting and neuralgic, momentary in duration, generally confined to the legs, though they may appear in the trunk, arms and even the head, the paroxysms sometimes lasting hours at a time. The hyperesthesia or anesthesia of the skin also becomes more marked; hitherto it may have failed to attract special attention. The eye disturbances at this stage are double vision, strabismus, ptosis, and sometimes beginning atrophy of the optic nerve.

A very important early symptom, which is found in 90 per cent of the cases is the *Argyll-Robertson pupil.* This consists of the failure of the pupil to react to light while accommodation for distant objects is retained. It is elicited as follows: The patient is brought to an open window and directed to look at near and distant objects; accommodation is found to be good. The eyes are then closed until the pupils are thoroughly dilated and a bright light brought directly before them; the response of the pupil to the light is retarded or absent.

Another characteristic symptom at this stage is decrease or abolition of the patellar reflex or "knee-jerk" (*Westphal's symptom*). This is obtained by directing the patient to cross

the legs. The patelkar tendon, just below the knee, is struck sharply with the tips of the fingers. Normally there is a responsive upward jerk of the foot and leg; this movement is diminished or absent in tabes.

Under the name of *hypotonia* Frankel has called attention to a peculiar symptom as characteristic of locomotor ataxia. This is described as follows, by Dr. H. C. Wood: "If a normal man lie down upon the floor, or other flat surface, upon his back, with the head on a small pillow, and raise the legs until they are fully flexed upon the trunk, the knee, unless it be in exceptional cases, will always be very decidedly bent. On the other hand, the tabetic person can, in the position just spoken of, completely straighten his legs when at right angles to the body —so at least it has been stated."

Ataxic Stage.—During this stage there is diminished coordination; that is, muscular movements in the area supplied by the degenerated portion of the cord, which were formerly automatic, can no longer be performed without a conscious effort of the will and careful observation. The symptom is often first noted at night, the patient finding it difficult to walk in darkened streets without a groping, staggering gait. As the disease progresses this becomes more characteristic. In a well developed case the patient lifts the feet high from the ground, carries them forward with a jerky, circular movement and plants them on the ground "flat-footed" with a stamp. The limbs are spread well apart, he usually walks with a cane and with the eyes fixed upon the ground.

The ataxia is well shown by his staggering attempts to walk a line upon the ground, or better, by requesting him to stand erect with the feet close together and the eyes closed; the body will sway from side to side or he may even fall. This is called *Romberg's symptom* and is present in about 90 per cent of the cases. Rarely the lack of coördination may appear primarily in other portions of the body; usually it is secondary. The hands and arms may be affected; in such instances the patient is unable to pick up a pin, button his clothes, write, play the piano or perform other acts requiring automatic movements. With the eyes closed motions are lacking in precision and the sense of locality is diminished or lost, as when he attempts to

put the tips of the fingers together or touch the nose, ear, etc.

Other sensory disturbances are now added to the lightning pain. Anesthesia becomes more marked and there is impairment of the tactile sensation. The patient has the sensation as if he were walking on velvet or cotton. There is analgesia or diminished sensibility to pain, as shown by sticking pins into the flesh. The transmission of sensations is slow. Or there may be parasthesia—burning, tingling, creeping, etc. A sense of constriction around the wrists, legs or body (girdle pains) is often added at this time.

Gastric crises appear in many cases of tabes as severe, recurring paroxysms of pain in the stomach, with nausea and vomiting, but without the physical evidences of gastric disease. Crises may occur in other portions of the body, with pain in the abdominal, vesical or cardiac regions.

Trophic phenomena are sometimes seen, such as falling of the hair, loosening of the teeth and the appearance of ulcers on the feet. Rarely enlargement of the joints may occur (Charcot's joints). The large joints are most affected and become swollen and deformed, but are free from pain and tenderness. The long bones are very easily fractured.

Loss of sexual power is usually an early symptom and soon becomes complete.

Paralytic Stage.—During this stage the sphincters of the rectum and bladder become paralyzed and incontinence of feces and urine results. The optic symptoms, which before this have been transient, become permanent, with impairment of vision or even blindness. The condition becomes more and more deplorable. Hemiplegia may result or dementia follow the terrible mental depression.

DIAGNOSIS.—In a well marked case of locomotor ataxia no difficulty attends the diagnosis. The leading symptoms upon which the accuracy of the diagnosis rests are, (1) abolished knee-jerk; (2) Argyll-Robertson pupil; (3) lightning pains; (4) ataxia, shown by gait or Romberg's symptom; (5) ocular palsies. If two or more of these symptoms are present, the evidence is very strong, if not conclusive.

In the *pseudo-tabes* of arsenical or alcoholic neuritis we have pain and tenderness along the course of the nerves, absence of

lightning pains and absence of Argyll-Robertson pupil. The foot is lifted high to keep the toes from dragging.

In *multiple sclerosis* the knee-jerks are usually increased, the pains are of a different character and there is a peculiar speech, tremor and nystagmus.

In *general paralysis of the insane* the history will usually decide. It may be implanted upon a tabes or the spinal symptoms may occur in paresis.

Neuralgic or rheumatic pains are readily differentiated by an examination which will show the presence or absence of the cardinal symptoms.

PROGNOSIS.—The disease is incurable and progressive but its course is often very slow, extending occasionally over periods of twenty or thirty years. Death usually results from complications, rarely from the disease itself. With intensification of the ocular symptoms there is frequently improvement of the ataxic and other symptoms.

TREATMENT.—*Syphilitic.*—There is a great difference of opinion concerning the value of anti-syphilitic treatment in tabes. It seems, however, that in early cases, where no considerable period has elapsed since the appearance of the syphilitic lesion, especially if evidences of that disease still remain, that most may be expected from the use of mercury. It may be given by inunctions, a teaspoonful of mercurial ointment being rubbed into the axilla or groin daily, or internally in the form of the bichlorid ($^1/_{24}$ grain three times a day) or the protiodid ($\frac{1}{4}$ to $\frac{1}{2}$ grain three times a day). In some cases a combination of bichlorid of mercury with potassium iodid is more satisfactory, the dose of the mercury remaining stationary but the iodid being gradually increased. The following may be used at first:

Mercury bichlorid	gr. 2
Potassium iodid	oz. 1
Distilled water	oz. 6

Teaspoonful well diluted three times a day.

Where there are no manifestations of syphilis Collins expresses the opinion that mercury not only does no good but may do actual harm. The value of potassium iodid is generally admitted. This author recommends that it be given in 6 to

10 grain doses three times a day, as an alterative, in order to arrest the degeneration of the neurons. Most authorities, however, recommend that it be given in full doses, 30 grains or more, three times a day and increased. This would only seem to be warranted where the syphilitic history is marked. In moderate doses it is a remedy of great value.

General Treatment.—Of all remedies in the treatment of locomotor ataxia the most valuable is *rest*. Over-exertion and fatigue must be avoided and in incipient cases or where the crises or pains become marked and troublesome a period of complete rest in bed will give more benefit than any other measure. Massage is helpful as a substitute for the usual exercise. The diet should be nutritious and simple, but requires no special rules. Alcohol and sexual excesses should of course be avoided.

Hydrotherapy is useful for the relief of symptoms but has no marked effect upon the course of the disease. The tepid bath is usually employed. Very hot or cold baths may be harmful. In vigorous patients the cold shower with friction is not only safe but of undoubted value. A course of treatment at one of the foreign spas,—Oeynhausen, Nauheim, Minden or Aix-la-Chappelle is often recommended.

There is considerable difference of opinion as to the value of *electricity*. Galvanism is warmly praised by many authors. Erb applies the negative pole over the cervical sympathetic (side of the neck) and the positive pole at the opposite side of the spine. This is moved up and down while a current of four milliamperes is allowed to pass. The opposite side is treated in the same way. The faradic current is applied to the lower extremities for the relief of pain and parasthesia and as a stimulant to the muscles and circulation. The brush electrode is used.

Medicinal Treatment in the main is disappointing. Perhaps the most useful drug is potassium iodid given in moderate doses as already recommended. Next in value is silver nitrate. The dose is $^1/_6$ to $\frac{1}{4}$ grain in pill form three times a day. Its long continued use is likely to produce discoloration of the skin; it must therefore be employed with care. It is a good plan to give it for five or six weeks and then give the potassium iodid

for a while. These two drugs seem to modify the disease process somewhat—at least, in some cases. After the system is saturated with silver Da Costa recommends strychnin:

Strychnin sulphate .....gr. 1½
Syrup hypophosphites .....oz. 12
Teaspoonful in water three times a day.

Strychnin is used more to improve nervous tone than for specific effect upon the spinal lesion. Arsenic is also found very beneficial by some authors. Five drops of Fowler's solution, $^1/_{30}$ to $^1/_{20}$ grain of arsenous acid or $^1/_{20}$ to $^1/_{10}$ grain of sodium arsenate, may be given at a dose, three times daily.

Darkschewisch (Neurog. Centralblatt) has recently reported favorable results from the use of sodium nitrate. He injected daily one centigram of a 1 to 3 per cent solution, gradually increasing the dose from the minimum to the maximum strength. Under this treatment the pains, ataxia, bladder weakness and other symptoms improved and weight increased. Even ocular atrophy was benefited. At least eighty injections were given each patient. Others have not obtained as good results.

Ammonium chlorid was formerly much used. Ringer got good results from Calabar bean. The organic extracts (especially the testicular) were enthusiastically praised by Brown-Sequard, but other clinicians have failed to obtain as favorable results.

Mechanical Treatment.—The *suspension* method has largely gone out of vogue, though it is not without its advantages. It consists in suspending the patient from the neck and shoulders in such a way as to put the spine on the stretch. The Sayre apparatus was generally used, although other appliances have been employed. A simple method of stretching is for the patient to lean forward as far as possible while sitting in a chair with the knees together. By pressing upon the head the spinal tension is further increased. This stretching process in some way probably stimulates the circulation of the blood around the cord. It probably does not modify the course of the disease but often gives decided relief to the pain and more disturbing symptoms.

Next to rest the method of treatment which is most positive in its results is Fraenkel's method of re-educating the muscles to perform co-ordinated movements. As originally given by

Fraenkel the exercises seem somewhat formidable, but no elaborate mechanism is necessary and any physician can easily improvise movements for the daily exercise of the affected members. It is, however, necessary to demand persistence, exactness and regularity in their employment and to avoid over exertion or fatigue. Whenever possible they should be made under the eye of the physician or a competent instructor. When the legs are ataxic, treatment may be commenced with simple movements—while the patient lies in bed. The limbs are alternately flexed, extended, turned first to one side and then to the other, using system and precision in every movement. Then rising from a chair without assistance is tried and similar exercises made with the feet. Walking movements are now practised and the patient encouraged to perform them without the help of his stick and without watching the movements of the feet. These may be simplified or elaborated according to the necessities of the case. In a similar fashion hands and arms may be educated. The exercises are at first simple and as these are mastered are made more and more complex. This method of treatment is contraindicated in weak, anemic individuals or during the course of acute attacks.

Special Treatment.—For the relief of the lightning pains it is usually necessary to give analgesics, though hot or cold applications to the limbs may be tried, sprays of ether or methyl chlorid to the spine, or if spinal anesthesia is decided, touching with the actual cautery along the course of the cord. Better still are electricity, the warm bath and rest in bed. Phenacetin, acetanilid, antipyrin, exalgin, etc., may be used for this purpose. Germain See recommended the salicylates. One of the following may be tried:

Antipyrin	oz. 1
Syrup ginger	oz. 1
Water, enough to make	oz. 4

A teaspoonful every one to four hours for three to six doses.

Collins recommends:

Caffein salicylate	gr. 1
Salol	gr. 5
Phenacetin	gr. 10

One powder. To be given every two hours until pain is relieved.

If the attack occurs at night and the caffein causes wakefulness he recommends the conjoined use of phenacetin and chloralamid. In the more severe attacks it will be necessary to resort to morphin, given hypodermically.

In *gastric crises* cerium oxalate (10 grains) or bismuth subnitrate may be administered. It is often necessary to resort to morphin. The same is true of rectal and vesical crises; morphin and belladonna suppositories give relief:

Morphin sulphate .....gr. ¼—½
Ext. belladonna .....gr. ½
Cacao butter, a sufficient quantity.

In cardiac crises strychnin, caffein and other heart tonics are indicated. Morphin is generally required in the laryngeal form —or a little chloroform may be inhaled.

Strychnin or the following is recommended in optic atrophy:

Gold and potass. cyanid.....Gm. 0.20
Distilled water .....Gm. 10.00

Five drops injected into the muscles of the back once daily. The dose is increased by 1 drop until fifteen drops are given.

Retention of urine calls for the use of the catheter; if there is incontinence it is necessary to use the urinal bag and the bladder should be washed out daily. In the paralytic stage the patient must be confined to bed.

LUNG, CIRRHOSIS OF—See Pneumonia, Chronic Interstitial.

LUNG, INFARCTION OF; PULMONARY EMBOLISM.

DEFINITION.—A local area of hemorrhagic infiltration of the lung.

ETIOLOGY.—Usually caused by the lodgment of an embolus at the bifurcation of one of the pulmonary arteries; less frequently a thrombus may be formed. Sometimes the occlusion may be due to blood stasis from sluggishness of the circulation. It occurs in diseases of the lungs and mitral lesions of the heart. Degeneration of the arteries may cause escape of blood into the lung tissues—a true *pulmonary apoplexy.*

PATHOLOGY.—The infarction is most likely to occur in the lower lobe of the right lung and consists of a dark colored, cone-

shaped mass of infiltrated lung, with its base, in most cases, upon the pleura. This mass is filled with transuded leukocytes and red blood corpuscles and corresponds to the area supplied by the occluded artery. The air-cells are obliterated. The process may be single or multiple.

The exudate may be absorbed and replaced by an area of induration, or, if infected, undergo degenerative changes resulting in the formation of an abscess.

SYMPTOMS.—The severity of the symptoms depends upon the size of the occluded artery. If it is large, immediate death is produced; if very small there may be an absence of symptoms. Usually there is sudden pain in the side, great dyspnea, cough and often bloody expectoration. In severe cases there may be fainting and convulsions with unconsciousness.

Physical signs may be absent; in large infarctions there is dulness, increased vocal fremitus, bronchial breathing and sometimes a pleural friction sound over the affected area.

PROGNOSIS.—Depends upon the cause and the size of the affected area. If large the prognosis is very grave. There is danger of subsequent abscess.

TREATMENT.—The patient should be kept absolutely quiet, active counter-irritation made to the chest and morphin administered hypodermically for the relief of pain. The treatment should be addressed mainly to the causative condition. If cardiac disease is present or the heart's action is weak, strychnin, digitalis, camphor, etc., should be administered. The condition itself is not influenced by treatment.

LUPUS ERYTHEMATOSUS.

DEFINITION.—A disease of the skin, occurring most frequently on the face and characterized by the formation of red, infiltrated patches which are covered with grayish or yellowish scales.

ETIOLOGY.—It occurs more frequently in women than in men and is a disease of adult life. Its cause is not known. Tuberculosis is not a factor.

PATHOLOGY.—The condition is a chronic inflammation of the true skin, probably commencing in the sebaceous glands.

SYMPTOMS.—The disease usually begins in one or more

slightly elevated, reddened macules which increase in size or coalesce in such a way as to form pink or reddened patches, often of considerable size. These patches have depressed centers and elevated margins and spread slowly at the periphery. They

FIG. 9. LUPUS ERYTHEMATOSUS.

are often multiple and show a tendency to symmetrical development. The most frequent seats are the nose and cheeks. From the fact that a small patch is often formed on the nose and larger ones on the cheek on either side, the appearance in a typical case has been likened to that of the butterfly with spread wings. The lesion is covered with adherent scales, which on the under side dip down into the mouths of the dilated sebaceous glands. There is no tendency to ulceration; nevertheless there is usually scarring in the atrophic centers.

DIAGNOSIS.—The characteristic features are a circular scaly skin lesion with elevated margins and a depressed center. It bears some resemblance to *ringworm*, but the latter disease heals in the center with healthy skin and shows no such chronicity.

Lupus vulgaris develops in early life, presents more or less

marked papules or tubercles, does not affect the sebaceous glands and tends to ulceration.

PROGNOSIS.—The disease usually terminates in recovery, but it often resists treatment and may last for years. It does not affect the health.

TREATMENT.—Various alterative and tonic drugs are used internally, including iodids, arsenic, phosphorus, quinin, ichthyol, ergot, etc., but they have little if any influence upon the course of the disease.

In the more acute stages of the disease, when there is considerable hyperemia and irritation, sedative applications are indicated. Walker recommends the following calamin lotion:

Calamin	oz. ½
Zinc oxid	oz. ½
Boric acid	dr. 1
Glycerin	dr. 2
Water, enough to make	oz. 6

In most cases, and especially if there is much involvement of the sebaceous glands, something more stimulating is required. Daily scrubbing with tincture of green soap, followed by a soothing ointment, is an efficient method of treatment. Sulphur is highly recommended in ointment or lotion (1 to 2 drams to the ounce). The following is a good formula:

Precip. sulphur	dr. 1
Oil cade	dr. 1
Zinc oxid ointment	oz. 1

Apply twice a day.

The following mild stimulant lotion is recommended by Duhring:

Zinc sulphate	dr. ½
Potassium sulphid	dr. ½
Alcohol	dr. 3
Rose water	oz. 3½

To be applied twice daily.

For a more stimulating effect Hyde recommends:

Chrysarobin	dr. 2½
Salicylic acid	dr. ½
Calamin	dr. ½
Ether	dr. 1
Flex. collodion	dr. 5

To be applied with a brush.

Ichthyol and resorcin are also useful in lotions (5 to 60 grains to the ounce). The former may also be used in ointment. Mercurial ointment applied as a paste or plaster is often beneficial. More heroic methods of treatment in obstinate cases include cauterization with silver nitrate, caustic potash, carbolic acid, pyrogallic acid, blistering with cantharides, the actual or galvano-cautery and linear or multiple scarification.

LUPUS VULGARIS.

DEFINITION.—A tubercular disease of the skin, characterized by the presence of brownish red papules or tubercles and tending to ulceration.

ETIOLOGY.—The disease is caused by infection of the broken or abraded skin with the tubercle bacilli. It usually commences early in life and is rather more common in females than in males. It is much less frequent in this country than in continental Europe. Predisposing causes are bad hygienic surroundings and a poorly nourished body.

PATHOLOGY.—The essential element of the cutaneous lesion are the nodules or tubercles. These are soft, being described by Hutchinson as like "apple-jelly." They are located in the true skin and may be simple, but are usually multiple, tending to coalesce to form nodular masses of variable size. Examined microscopically they are found to consist of epithelial cells and sometimes contain giant cells and tubercle bacilli. The vessels of the corium are dilated and the intervening tissues are infiltrated with leukocytes. Ulceration occurs in most cases.

SYMPTOMS.—Lupus vulgaris occurs most frequently upon the face, especially on the nose, cheeks and ears, but it may attack any cutaneous surface and is quite often found upon the mucous membrane of the mouth, nose, etc. It usually begins as a number of small, discrete papules, which increase in size and coalesce to form the characteristic, soft, brownish-red nodules imbedded in the corium and covered by epidermis. These may become as large as a pea or even larger. The tubercles may be absorbed, leaving a scaly, scarred surface (*lupus exfoliativus*) or may break down into shallow, chronic ulcers, with the formation of brownish crusts and followed by well-marked cicatrices (*lupus exulcerans or exedens*). Granulation tissue may

form extensively at the borders of the ulcers, giving rise to a condition known as *lupus hypertrophicus*, or warty growths may appear (*lupus verrucosus*).

The disease increases in size at the periphery of the patch, where the nodules are most numerous, but these are also scattered throughout its center where the skin is atrophic and covered with ulcers and scar-tissue.

There is little or no pain and the constitutional disturbance is slight. The disease is very chronic and may persist for many years, the activity of the eruption varying from time to time.

DIAGNOSIS.—The principal points of distinction between this disease and lupus erythematosus have already been traced. It may perhaps sometimes be mistaken for syphilis or rodent ulcer. The following table shows the principal points of difference:

LUPUS VULGARIS.	SYPHILIS.	RODENT ULCER.
Commences in childhood or adolescence.	A disease of adults.	A disease of middle or advanced life.
The course is slow.	The course much more rapid.	The course more rapid than lupus, but much slower than syphilis.
History often tubercular.	History of infection.	History negative.
Nodules soft, like "apple-jelly."	Nodules hard.	
Ulcers are multiple and superficial; covered with brownish-red crust; edges soft.	Ulcers may be deep but not characteristic; copious discharge, greenish scales.	Ulcers single and deep; edges hard and pearly.
Little or no pain.	Slight pain.	Painful.
Does not respond to "specific" treatment.	Heals under the iodids and mercury.	Does not respond to "specific" treatment.

PROGNOSIS.—The disease is very chronic and difficult to manage successfully, but cases of moderate severity under appropriate modern treatment usually recover or at least are greatly improved.

TREATMENT.—*General Treatment.*—The patient's health should be kept at the highest possible standard by attention to

the details of personal hygiene, including residence and employment in a comfortable and properly ventilated building or rooms, an abundance of simple, nutritious food and plenty of healthful out-door exercise. Cod-liver oil, strychnin, quinin, arsenic, iron and the iodids should be prescribed to meet the special indications of the case. Tuberculin was formerly much used, but at present is not in favor. It undoubtedly does good in some cases. Thyroid extract has also been used with asserted good results.

Local Treatment.—This is the most important part of the treatment. In the less severe cases mild applications should first be tried. Among those used are mercurial plaster, ointment of mercury oleate (10 to 20 per cent), lotion or ointment of mercuric chlorid (1 to 2 grains to the ounce), salicylic acid plaster (10 to 20 per cent), creosote plaster (40 per cent), or a lotion of resorcin (10 to 60 grains to the ounce). Or the part may be occasionally washed with pure carbolic acid, or lead plaster containing 20 per cent of ichthyol may be constantly applied.

Usually, however, cauterizant applications or operative measures are required. The solid stick of silver nitrate may be rubbed in thoroughly, only a small area being treated at a sitting. Formaldehyd (40 per cent) may be swabbed on every two or three days and the part poulticed for the removal of sloughs. Pyrogallic acid is quite effective and causes little pain, but is slow. Brocq uses the following:

Pyrogallic acid	gr. 50
Salicylic acid	gr. 50
Collodion	oz. 1

Paint over the part every day until a slough is produced, then poultice and after its removal reapply as necessary.

The pyrogallic acid may also be used in the following ointment:

Pyrogallic acid	dr 2
Lead plaster	dr. 1
Resin cerate	dr. 5

This is kept applied for one or two weeks, the part being frequently poulticed to keep it free from slough.—Stelwagon.

Arsenic is also used as a caustic and attacks by selection diseased tissue; but it is more painful than the above, and, as

it may be absorbed, should not be applied to large areas. Hebra prefers—

Arsenous acid	gr. 20
Red sulphid of mercury	dr. 1
Rose ointment	oz. 1

Spread thickly on cloth and apply to the patch for two or three days until the lupus nodules are blackened or destroved. Then poultice.

Zinc chlorid is also used as a cauterizant, but has no special advantages over the above.

The galvano- and thermo-cautery have also been used for the destruction of the lupus eruption. Similar in effect is superheated air (about 300° F.), applied through a blow-tube to the diseased area. Finsen has recently demonstrated the curative results obtained by concentrating the actinic rays of the sun or electric light upon the eruption. The X-ray has also been used successfully.

Obstinate cases may require surgical interference. The methods used include multiple, linear or punctate scarification, curetting and excision. The galvano-cautery knife may be used with the former and cauterization with silver nitrate may follow the use of the knife in any instance. The subsequent treatment should be antiseptic.

LYMPHADENOMA; PSEUDO-LEUKEMIA; HODGKIN'S DISEASE.

DEFINITION.—A constitutional disease characterized by progressive anemia, enlargement of the lymphatic glands and usually of the spleen.

ETIOLOGY.—The disease occurs most frequently in young adult males. The exciting cause is unknown but is probably infectious.

PATHOLOGY.—The lymphatic glands are the primary seat of the disease and the superficial glands, those of the neck, axilla and groin, are usually first attacked and most enlarged. The increase in size is due to hyperplasia, both of the cellular and connective tissue elements. If the first are most affected the gland is soft and elastic; if the latter suffers most, the gland is hard and resistant. The retroperitoneal glands and all other

lymphoid structures, including those in the tonsils, lungs, liver, brain, etc., may be involved. The spleen is usually enlarged but less than in leukemia. The bone-marrow often becomes softened.

SYMPTOMS.—The first symptom to be noted is usually the enlargement of the glands of the neck; this is most prominent on one side. These may reach a very large size. The disease spreads to the axillary, then to the inguinal and finally to the internal glands, the spleen and other viscera. Associated with the glandular enlargement there are the marked constitutional symptoms: Lassitude, pallor, shortness of breath, digestive disturbances, sometimes mucous hemorrhages and finally emaciation and edema of the limbs. The pressure of the enlarged glands may cause difficulty of swallowing or breathing, local congestion or edema, disturbances of sensation, neuralgic pains and paralyses, and a peculiar bronzing of the skin (said to be due to pressure upon the suprarenal). The enlarged glands are themselves usually painless and seldom suppurate. In some cases there is an irregular intermittent fever.

There is usually more or less reduction in the number of red cells and the quantity of hemoglobin is always diminished. There may be some increase in the number of white cells, but this is always moderate as compared with leukemia.

DIAGNOSIS.—Tuberculous adenitis may be hard to distinguish from lymphadenoma at first. It is, however, more frequently unilateral, tends to suppuration, often occurs earlier in life, does not spread so rapidly to other glands and there are no attacks of intermittent fever, such as sometimes occur in lymphadenoma.

A study of the blood changes will differentiate from leukemia. The history of syphilis, a study of the symptoms and specific treatment with mercury will settle any difficulty regarding the presence of that disease.

PROGNOSIS.—The disease is almost inevitably fatal within two or three years.

TREATMENT.—To maintain the health of the patient at as high a standard as possible nutrients and tonics should be administered, such as cod-liver oil, iron, quinin, strychnin, etc. The best possible hygienic surroundings should be provided and

a generous diet prescribed. Arsenic is the best single remedy and may modify the course of the disease; ascending doses of Fowler's solution should be given until the patient has reached the point of tolerance and continued for a long time. Iodin, ichthyol, potassium iodid ointment, electricity, etc., are used locally, but with little effect. It may be necessary to extirpate some of the glands to relieve pressure symptoms.

MALARIA.

DEFINITION.—An infectious disease due to the presence of a specific parasite in the blood and characterized by a periodic, intermittent or remittent fever.

VARITIES.—According to the character of the symptoms the following varieties may be described: (1) Intermittent fever; (2) remittent fever; (3) pernicious fever; (4) malarial hematuria; (5) chronic malaria or malarial cachexia. There are also irregular and mixed types.

ETIOLOGY.—Malaria may occur in any climate but is more common and more severe in tropical and subtropical countries. Low, flat, insufficiently drained and swampy localities are most likely to be infected. No age or sex is exempt, but out-door labor predisposes to its occurrence. Negroes are less susceptible than whites.

The exciting cause is now known to be a hematozoon, the *plasmodium malariæ* belonging to the protozoa. There are three distinct forms of this parasite: (1) The tertian; (2) the quartan; (3) the estivo-autumnal. These cause all of the acute forms of the disease.

1. *Tertian parasite.* This is seen in the blood as a small, hyaline body, having ameboid movements and occupying a red blood corpuscle. Its diameter is at first one-sixth to one-fourth that of the red cell. Upon studying its development under the microscope fine granular pigment, derived from the hemoglobin of the cell, is observed early. This is seen to be in active movement and finally collects in the center of the body, which becomes segmented into from 12 to 20 parts or spores. While this process is going on the blood corpuscle becomes paler and enlarged, the parasite finally fills it and when sporulation is

complete breaks out into the blood plasma, where most of the spores are destroyed by phagocytes, while the remainder enter into other blood cells to repeat the process. The life of the parasite is about 48 hours. The paroxysm, which occurs every other day, is coexistent with the process of sporulation, and terminates when this process is completed by the "brood" of parasites which excite it. It is probably caused by the release of a toxin into the blood plasma.

In some cases an individual is infected by two broods of parasites on alternate days. This causes a daily paroxysm—the double tertian or *quotidian* form of the disease. Flagella are occasionally seen, always free in the blood, never intracellular.

2. *Quartan parasite.* The early stage of this parasite does not differ greatly from that of the preceding. Like it, this is a small, hyaline, ameboid body. The pigment granules are, however, coarser and their movements sluggish. The pigment collects in the center and spores are formed around it; they number from 6 to 12. The quartan parasite does not attain the size of the red blood corpuscle as does the tertian parasite; but the cell shrinks around it. The process of cell growth and sporulation is completed in 72 hours. The paroxysms therefore occur every fourth day, that is, there is an interval of two days between attacks. If the patient is infected, on different days, with two broods of the parasite he has a paroxysm on two successive days (double quartan) and escapes the third. If infected with three different broods he has a daily paroxysm—*quotidian.*

3. *Estivo-autumnal parasite.* This is the parasite of the remittent and severe malignant types of tropical malaria. During the early stages of the paroxysm it may be seen as a very small hyaline body in the blood, but its later development takes place in the spleen and bone-marrow. They are often ring-shaped and after a week or ten days form characteristic crescents which may be seen in fresh blood and are not seen in the tertian and quartan types. The red cell becomes shriveled and sometimes notched. This form matures in 24 to 48 hours.

Machiafava and Bignami have separated the estivo-autumnal parasite into two varieties, one causing a paroxysm in 24, the

other in 48 hours. Craig of the U. S. army, who has made an exhaustive study of the parasite in Cuba and in troops returning from the Philippines, comes to the same conclusion. He describes quotidian and malignant tertian forms. The former is smaller, often there is more than one parasite in a corpuscle, is very active, it loses its ring form before pigmentation, its granules are coarse and motionless, there are six to eight spores and the crescents are small, plump and contain a small amount of pigment; the latter are larger and sluggish, there is but one in each cell, which has a ring form, they have fine granules which are active, the spores are ten to fifteen in number and the crescents are long, narrow and deeply pigmented.

It may now be considered definitely settled that malaria is transmitted by certain varieties of mosquitoes; the *anopheles* seems to be the principal offender. The inoculation experiments made in various places and by different men have shown that the disease can be produced in this way. The recent production of a typical estivo-autumnal fever in the son of Dr. Patrick Manson in London by the bites of infected mosquitoes brought from Italy seems to be a crucial test. Sambon and Low, on the other hand, showed that it was possible to live in the malaria-infested Campagna by residing in a house which protected them from the bite of the night-flying anopheles. Koch, as a result of his recent investigations in East Africa, asserts that the only true host of the parasite is man.

Pathology.—The most constant change is found in the blood. The number of red blood corpuscles is greatly reduced by the destructive action of the parasites and there is a corresponding decrease in the amount of hemoglobin. In severe cases the spleen is greatly enlarged and dark in color from the deposit of pigment. In chronic cases it may become hard ("ague-cake"). The liver may also become slightly enlarged. In malarial cachexia there is a symptomatic anemia of the viscera.

Symptoms.—*Incubation.*—Salinger and Kalteyer give the period of incubation of the tertian form as ten days; of the quartan, thirteen days; of the estivo-autumnal, three days.

Intermittent Fever.—This is caused by the tertian and quartan parasites—usually the former. The quartan type is rarely seen in this country. In the tertian form the paroxysm occurs

every other day; in the double tertian or quotidian it recurs daily. There are three distinct stages; the chill, fever and sweating.

The chill usually comes on in the late forenoon or early afternoon; it is frequently preceded by headache, creeping sensations, yawning and malaise. The onset is sudden, commencing with chilliness; this rapidly becomes more and more pronounced until the whole body is shaken and the teeth chatter. The skin is pale and the lips and finger nails are blue. The pulse is small, hard and rapid. In spite of the apparent coolness of the body there is a decided rise of temperature and internal congestion. Frequently there is nausea, vomiting or headache.

The duration of the chill is usually not more than an hour or two. It is immediately followed by the second stage, or that of *fever*. During this the skin is hot and dry, the thirst intense, there is severe headache, great restlessness and sometimes delirium. The temperature continues to rise until it reaches a maximum of 104° to 106° F. This stage lasts from one to six hours.

Next follows the third or *sweating* stage. During this the patient breaks into a profuse perspiration. The body is covered with sweat, which is so profuse as to drench the clothing or wet through the bedding. The temperature rapidly subsides and the headache and other symptoms are relieved. It lasts from one to three hours and is followed by the *remission*, during which the patient is free from fever and feels usually well.

Remittent Fever; Bilious Remittent Fever; Estivo-Autumnal Fever.—The onset of this form of the disease is usually preceded by malaise, loss of appetite, headache and disturbance of the stomach. The chill is less severe than in the intermittent form. It is followed by a gradual rise of temperature which reaches its maximum (104° to 106° F.) in ten to twelve hours. There is associated headache, pain in the limbs, dry skin, flushed face and thirst. The pulse is full and rapid. The decline of the fever is equally slow, the entire paroxysm lasting in the neighborhood of twenty hours. The temperature does not return to normal but is, during the stage of remission, only slightly elevated. There is a tendency for this period of remission to

a generous diet prescribed. Arsenic is the best single remedy and may modify the course of the disease; ascending doses of Fowler's solution should be given until the patient has reached the point of tolerance and continued for a long time. Iodin, ichthyol, potassium iodid ointment, electricity, etc., are used locally, but with little effect. It may be necessary to extirpate some of the glands to relieve pressure symptoms.

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In septicemia there are chills, fever and sweating, but these are irregular and not distinctly periodic. There is also leukocytosis, which is absent in malaria.

In cases of doubtful diagnosis the blood should be examined; the presence of the malarial parasites is conclusive evidence of the character of the disease. The therapeutic test is usually reliable: By the administration of quinin true malaria is benefited; it does not shorten the course of other diseases.

PROGNOSIS.—Under proper treatment most forms of malaria quickly recover. Recovery is most rapid in the forms caused by the tertian and quartan parasites. The estivo-autumnal varieties are most resistant and show a decided tendency to linger. The pernicious fevers are very dangerous and are attended with a high mortality.

Not the least of the dangers is the likelihood of complications and sequels. These include the grave anemias, neuritis, pneumonia, dysentery, tuberculosis and nephritis. Relapses are common.

TREATMENT.—*Prophylaxis.*—Since it now seems to be an established fact that malaria is transmitted by mosquitoes it is reasonable to believe it a preventable disease. In order to prevent it we must exterminate the malarial mosquito or prevent its access to men.

Experiments recently made on a large scale in the malarial districts of Italy, in addition to those of Sambon and Low, show that the simple expedient of screening the doors and windows of the house in such a way as to exclude the mosquitoes, and staying within doors after nightfall, will prevent the disease in many cases. Various volatile substances were tried by Celli and Casagrandi to stupefy or kill the mosquitoes in a living room. Among those of merit were turpentine, iodoform, menthol, nutmeg, camphor and garlic, and the fumes of tobacco, crysanthemum powder, eucalyptus leaves, quassia wood and pyrethrum powder. Those authors also suggest that growing the crysanthemum plant on a large scale might free a locality from mosquitoes. (Insect powder is derived from a variety of crysanthemum.) The growth of eucalyptus trees has been tried and, it is asserted, with benefit, but Celli condemns the growing of trees of any kind near a dwelling since the shade offers protection to the mosquito.

As direct destroyers of mosquitoes coal-oil is probably as useful as any cheap substance. It is spread on the waters of an infected locality; it destroys the larvae in large numbers. Recent experiments made in Havana show that these applications must be repeated at short intervals, probably twice a month, in order to keep the surface of the water free from larvae. This method is recommended by L. O. Howard of the United States Agricultural Department, who also suggests that the cultivation of the dragon-fly or "devil's darning needle," which is known to feed upon mosquitoes, might be useful.

Probably the most practical way of preventing malaria on a large scale is by draining the land of stagnant water and putting it into cultivation. Persons going to malarial countries may fortify the system against malarial infection by the internal use of quinin.

The Paroxysm.—The physician is usually first called to see the patient during the acute stage. Not much can be done during the chill. The patient should be covered with blankets, a hot-water bag put to the feet and epigastrium and hot drinks administered. Whiskey, aromatic spirits of ammonia and spirits of chloroform may be taken internally to add to the sense of warmth. Wilson (Buffalo Med. Jour.) uses the following to break up the chill:

Spts. chloroform	m. 20
Tinct. opium	m. 20
Whiskey	oz. 2

One dose, diluted.

The possibility of aborting the paroxysm has been discussed. Brodnax claims it can be done by the use of chloroform (25 drops in syrup or glycerin), by the use of acetanilid (5 to 8 grains) or pilocarpin ($^1/_{10}$ grain). These are given previous to the chill or even during it, in order to precipitate the sweating stage.

Quinin is a true specific for malaria. It has been indubitably proven that it destroys the malarial hematozoon with little or no risk to the patient. In order to get the best results it is important to know just when to give it. Knowing this it is no longer necessary to resort to the enormous doses formerly used and which were undoubtedly harmful. The object is to saturate the blood at the time when the parasite is most susceptible. This

is during the stage of sporulation, when the red corpuscles are disintegrated and the spores are left floating in the blood plasma. This is coincident with the paroxysm. Since quinin is not readily absorbed at this time and may be rejected by the stomach it is usually the custom to give it some time before. Most authors recommend its administration four to six hours before the expected chill, some giving it in divided doses, the last of which comes not less than two hours before the attack. It seems wiser to the author to give the entire quantity in a single dose an hour or two before, or, as recommended by Dock, during the decline. If the patient is seen during the attack, its subsidence should always be followed by quinin.

In this country the sulphate is the salt most used. As this is only sparingly soluble in water, the bisulphate is to be preferred. The sulphate is, however, freely soluble when administered with an acid. Laveran prefers hydrochloric acid.

The dose is important. It is agreed that the enormous doses sometimes given are unnecessary and unwise. It is rarely expedient to give more than 30 grains a day. In general 15 grains may be looked upon as an average dose, while in the severe and more obstinate forms 20 grains may be considered the normal amount. When the single large dose is not well retained it may be given in 5-grain doses one-half hour apart. In mild cases 2 or 3 grains three times a day may break up the attack.

In the *remittent* fevers of the estivo-autumnal type the paroxysm and interval is not so well defined. The quinin may therefore be given in these cases in 5 to 10 grain doses every four to six hours. The largest quantity should be given during the decline.

In either the intermittent or the remittent form, if the paroxysm shows a tendency to recur, each recrudescence should be treated as an acute attack. To prevent recurrences, 9 to 12 grains of quinin should be given daily for a week and then continued in smaller doses.

Quinin pills and tablets should never be used. Dock recommends that the drug be given in 5-grain capsules, followed by a small dose of dilute hydrochloric acid. If the patient will take it, the acid solution is best. Below are given prescriptions:

Quinin sulphate .....dr. 2
Arom. sulphuric acid.....dr. 1
Oil peppermint .....m. 5
Fl. ext. licorice.....oz. 1
Glycerin .....oz. 4
One or two teaspoonfuls every three or four hours.

Quinin sulphate .....dr. 4
Dilute hydrochloric acid.....dr. 3
Syrup orange .....oz. 1
Simple elixir, enough to make.....oz. 4
One or two teaspoonfuls, as needed.

Quinin hydrochlorate .....dr. 2
Dilute hydrochloric acid .....dr. 4
Dilute hydrobromic acid.....oz. 1
Syrup lemon .....dr. 4
Water .....oz. 1
Teaspoonful three times a day.—Eshner.

If there is constipation, before commencing active treatment it is better to give an active cathartic. The mercurials are considered peculiarly effective in malarial climates and especially so in the remittent fevers. A full dose of calomel (5 to 10 grains) or a blue pill may be given at bedtime and followed by a saline the following morning. Or the mercurial may be given with the quinin. Various drugs are used as adjuvants to quinin. Opium was long considered a potent remedy. W. H. Thompson (Med. News) believes that it is a most valuable remedy and uses it in cases which do not respond to quinin alone. Capsicum, ginger and other carminatives are much used. They probably have no specific effect, but their local stimulant action facilitates the absorption of the quinin. Prescriptions belonging to this class are the following:

Quinin sulphate .....gr. 10
Powdered capsicum .....gr. 3
Powdered opium .....gr. 1
One dose.—Alonzo Clark.

W. H. Thompson prescribes the following in resistant cases of the estivo-autumnal type, giving in conjunction with it three doses of paregoric, one-half ounce each:

Quinin sulphate .....gr. 15
Powdered ginger .....gr. 15
This quantity to be taken twice daily.

Claiborne recommends the following:

Calomel .....gr. 4
Dover's powder .....gr. 4
Quinin sulphate .....gr. 16

Make four pills. Two to be given at bedtime and two the following morning.

It is often difficult to give quinin to children. The drug is usually suspended in a syrup of licorice or yerba santa. These disguise the taste pretty effectually but do not leave the drug in a very favorable condition for ready absorption. It has been suggested that it may be given in coffee, with powdered ginger or other carminatives. The tannate of quinin is used with chocolate to make lozenges which children will eat. Hare recommends the following for children:

Quinin hydrochlorate .....gr. 16
Fl. ext. licorice.....dr. 1
Syrup orange peel.....oz. 2

A teaspoonful for a child of three years.

The remedy may also be given in the form of suppositories or by inunction with an ointment base. It is much slower of absorption in these ways and not suited to cases in which the symptoms are urgent.

It is claimed that euquinin will replace quinin as an antiperiodic. This drug is free from bitter taste and disagreeable after-effects, such as ringing in the ears and nervous disturbances. It would seem to be a useful drug to give children. Its dose is about the same as that of quinin.

The hypodermic method of administration is recommended in the pernicious malarial fevers in which it is important to saturate the blood in the shortest possible time. The hydrochlorate and bisulphate are usually used. Hare gives the following formulas:

Quinin hydrochlorate .....gr. 7
Glycerin .....dr. ½
Distilled water .....dr. ½

Warm solution before using and do not add acid.

Quinin hydrochlorate .....gr. 15
Alcohol .....m. 15
Distilled water .....dr. 1½

Add a few drops of hydrochloric acid to complete the solution before using.

There is some difference of opinion as to the value of the hypodermic method. Fackler reported that in twenty cases this mode of administration proved successful in but three; the remaining seventeen were cured by quinin by the mouth. It is probable that the salt is precipitated by the alkaline juices of the tissues and absorbed slowly. Baccelli used quinin by intravenous injection, giving 15 grains of the hydrochlorate with 15 grains of sodium chlorid in two and one-half drams of distilled water.

Whether or not quinin is to be given in *hemoglobinuria* is a mooted question. Koch makes the uncompromising statement that the drug causes this condition; others are as enthusiastic in its praise. Most authors recommend its use. Very large doses are not necessary.

It should be remembered that there are some individuals who are very susceptible to quinin. A. H. Smith asserts that this can usually be overcome by giving it with hydrobromic acid or sodium bromid. The number of persons who cannot take quinin in some form is certainly very small.

Various substitutes for quinin have been used. None equal it. One of the most promising is methylene-blue. This may be given to the amount of 5 to 7½ grains in twenty-four hours. It is best prescribed in capsule with an equal quantity of powdered nutmeg. We have already referred to euquinin. Cinchonidia is preferred in some cases. Wilson was successful in a large number of obstinate cases with the following:

Cinchonidia salicylate .....dr. 3
Essence of pepsin.....oz. 4

Teaspoonful after each meal, with Blaud pill and a laxative at bedtime.

Warburg's tincture is a very complex formula, much in use in India and deservedly popular. It sometimes succeeds when quinin alone fails. Eucalyptus is a favorite remedy with some practitioners; its antiperiodic powers are weak.

It is in the *subacute and chronic cases* that modifications of the quinin treatment and combinations with other drugs do the most good. Arsenic is even more valuable than is quinin in some of these cases, and iron and strychnin are often indicated. A number of favorite prescriptions are given:

Quinin sulphate .....gr. 40
Iron pyrophosphate .....gr. 40
Arsenous acid .....gr. 1
Powdered capsicum .....gr. 20
Aloin .....gr. 2
Make 20 pills. A pill three or four times a day.

Quinin sulphate .....dr. 1
Mass. iron carbonate.....dr. 1
Arsenious acid .....gr. 1
Make 20 capsules. One three times a day.

Quinin sulphate .....dr. ½
Fowler's solution .....dr. 1½
Tinct. iron chlorid.....oz. ½
Syrup ginger .....oz. 1½
Distilled water, enough to make.....oz. 4
Dessertspoonful after meals.

Strychnin sulphate .....gr. $^2/_3$
Arsenious acid .....gr. 1
Piperin .....gr. 20
Quinin sulphate .....gr. 45
Make 20 capsules. One capsule every four hours during the day.

Ergot is recommended by A. Jacobi in chronic intermittent fevers with much enlargement of the spleen, that have resisted the usual remedies. It may often be combined advantageously with quinin or arsenic. The ergot is also valuable in some cases of malarial neuralgia.

These chronic patients should, if possible, remove to a climate free from malarial infection. It is of primal importance to build up the general health. The tendency to recurrence should be kept in mind and quinin administered whenever the symptoms seem to indicate.

MEASLES, GERMAN—See Rubella.

MEASLES; RUBEOLA; MORBILLI.

DEFINITION.—An acute contagious disease characterized by an initial coryza and a rose-colored, macular eruption.

ETIOLOGY.—The disease usually occurs in epidemics, but sporadic cases are common. Children of both sexes are the most frequent sufferers, but adults are not exempt, and outbreaks of the disease in armies, garrisons and camps are not infrequent.

Infants less than six months of age are generally immune. The disease is most prevalent during the winter and early spring. One attack confers protection except in rare instances.

No specific microbe has yet been found, but measles is undoubtedly bacterial in its origin. The contagion is transmitted by the breath, by contact, clothing, etc. The discharges from the bronchial and nasal mucous membranes have been shown to be actively contagious; the epidermic scales are far less potent conveyers of the poison. The vitality of the infecting germ is much less than that of scarlet fever, but epidemics are usually more widespread.

PATHOLOGY.—The morbid changes found in the respiratory tract are those of catarrhal inflammation, not differing from the same condition produced by other causes. In measles the inflammation of the mucous membrane and the eruption are produced by the excretion of the toxin. The skin lesions consist of an acute hyperemia with cellular infiltration. In severe cases with complications there is a mixed infection with staphylococci or streptococci.

SYMPTOMS.—*The period of incubation* varies from nine to twenty-one days. According to Crandall it is usually twelve days; it rarely exceeds fourteen.

Stage of Invasion.—This begins gradually, often with drowsiness (especially in young children), irritability, chilliness and the usual symptoms of a "cold in the head," viz., persistent sneezing, a watery discharge from the nose, hoarseness, red inflamed conjunctivae, an abundant flow of tears and great sensitiveness of the eyes to the light. Within a day or two a dry, hacking cough appears. There is marked initial elevation of temperature (102° to 104° F.), but this is usually less on the second and third days, rising again when the eruption appears and reaching its climax the fifth or sixth days of the disease. Sometimes there is nausea, vomiting and diarrhea.

An early symptom of the disease described by Koplik consists in the appearance upon the mucous membrane of the cheeks and lips of six to twenty small red spots, each with a minute bluish-white center; these may be observed during the pre-eruptive period—often the first day of invasion.

Stage of Eruption.—The eruption usually appears upon the

fourth day of the disease, first upon the temples, edges of the hair and neck, then rapidly spreading to the chest, trunk and extremities. The wrists and backs of the hands are last to be affected. It consists at first of small red irregularly shaped spots or macules, slightly elevated above the surrounding skin, which is unaffected. Sometimes the spots become distinctly papular and give a "shot-like" sensation to the finger passing over them. In places it tends to become confluent, particularly on the face, chest, back and arms. The part is then more or less swollen and edematous. The spots are round or oval in shape and disappear upon pressure. Sometimes there are petechiae. In two or three days the eruption usually fades and by the fourth or fifth is entirely gone, being followed by desquamation of fine, bran-like scales.

In the hemorrhagic or malignant form of the disease ("black measles") there is extensive extravasation of blood into the skin and possibly hemorrhage from the mucous surfaces. The fever is very high and there is stupor or delirium and great prostration. As already stated, the temperature is decidedly elevated at the beginning of the eruptive stage and reaches its climax when the rash is at its height. From this time it rapidly subsides.

The catarrhal symptoms increase in severity when the rash appears and persist throughout the disease. Nosebleed is common. Diarrhea and increased frequency of urination are sometimes troublesome symptoms.

Complications and Sequelae.—The most common of these is broncho-pneumonia; lobar pneumonia is less frequent. Tuberculosis is sometimes a sequel. Laryngitis, otitis, chronic conjunctivitis, epistaxis, enterocolitis and other conditions due to the involvement of the mucous membranes are other complications. Pseudo-membranous anginas and whooping-cough may be associated with it. Cancrum oris, paralysis and chronic skin eruptions sometimes follow.

Diagnosis.—The diagnosis is usually not difficult if the cardinal symptoms are kept in mind, viz., a prodromal coryza, followed by the characteristic eruption. Before the appearance of the rash it is often impossible to state positively the character of the disease, but Koplik's spots, if recognized, are strong

corroborative evidence. The following table will assist in differentiating measles from the other acute eruptive diseases:

Measles.	German Measles.	Scarlet Fever.	Small Pox.	Chicken Pox.
Incubation 10-14 days.	Incubation 12-14 days.	Incubation 2-7 days.	Incubation 10-14 days.	Incubation 14-16 days.
Eruption preceded by fever coryza, photophobia, hoarseness and cough lasting 3 days.	Eruption preceded by feverishness, malaise and slight coryza; prodromes last only a few hours to a day or two.	Eruption preceded by high fever, vomiting and sore throat; prodromal stage 24 to 48 hours.	Eruption preceded by chills, high fever, vomiting and intense pain in head and back; stage lasts about 3 days.	Prodromal stage absent or consists only of slight feverishness and malaise.
Rose-colored, slightly elevated macules or papules; discrete or confluent; oval or crescentic outlines.	Eruption usually papular, resembling measles, but less distinct; may be scarlatiform.	Bright scarlet rash; punctiform; diffused; often uniform redness.	Papules soon becoming vesicles and finally pustules; umbilicated, or depressed tops.	Small red papules, becoming vesicles, no umbilication.
Forehead, face and neck first affected.	Face first affected.	Neck, chest and face first affected.	Appears first on forehead.	Face, scalp and shoulders first affected.
Eruption commences to fade sixth or seventh day of disease; fine desquamation.	Eruption fades more rapidly fourth or fifth day; slight desquamation.	Eruption fades fifth or sixth day; skin desquamates in large flakes.	Eruption forms large scabs upon maturing of pustules, eighth or ninth day; these fall off in 2 days.	Slight scabs form on the fourth day of fever.
Duration 7-10 days.	Duration 7-8 days.	Duration 7-14 days.	Duration 14-21 days.	Duration 6-7 days.

Prognosis.—Good in uncomplicated cases in vigorous patients. In young children, the debilitated or in case of complications the gravity of the disease is much increased. The average death rate is 4 to 6 per cent. In children under two years

of age Holt found a mortality of 20 per cent or more. Hatfield states that according to Chicago health reports, the death rate in children of this age reached 50 per cent. In crowded tenements, barracks or army camps the mortality is often high. Measles is one of the most deadly diseases to new races. In the South Sea Islands it has swept away thousands.

TREATMENT.—The patient should be put to bed in a large, well-ventilated room, kept at an even temperature (about 68° to 70° F.) and carefully darkened in order to protect the eyes, which must be used as little as possible. The bed clothing should not be too heavy and the bed so screened as to protect the patient from drafts of air. It should be remembered that the greatest danger in measles is from complications; therefore the patient should not be allowed to expose himself until the possibility of these is past. He should not leave the bed until a week after the disappearance of the rash, or the house for a week more.

The contagious nature of the disease should be kept in mind and proper quarantine enforced. When desquamation has ceased the sick-room should be thoroughly cleaned, bedding washed and a full hot bath given to the patient before he is allowed to mingle with his associates.

An uncomplicated case of measles requires little treatment. The thirst is relieved by lemonade or other acid drinks, or by flaxseed tea with lemon juice and sugar; the latter is especially comforting if the cough is troublesome. Drinks are to be given hot if the eruption is tardy in making its appearance. The diet should be mainly liquid. Milk is the best food in most cases, but beef juice, bouillon, broths, malted milk, and similar preparations will all be found agreeable. In mild cases a moderate amount of easily digested farinaceous food is admissible. Constipation is readily relieved by enemas of warm water. Laxatives are seldom required. The whole body should be bathed daily with warm water and rubbed with vaselin or cacao butter; this relieves the itching of the skin and helps to reduce the temperature.

The nasal symptoms are benefited by cleansing with an alkaline solution, such as Dobell's solution or glyco-thymoline, followed by an oily menthol spray, as—

Menthol .....gr. 10
Liquid petrolatum .....oz. 1

The conjunctivitis is relieved by cold compresses and bathing with borax or boric acid and water, as in the following:

Boric acid .....gr. 10
Camphor water .....oz. 1

The lids may be gently anointed with vaselin to prevent their sticking together. Reading should be absolutely forbidden until recovery is complete.

The temperature is kept in control by small, frequently repeated doses of aconite, which may be combined with sweet spirit of niter or solution of potassium citrate. If the temperature is high and the strength is good, phenacetin, antipyrin or acetanilid may be used in small doses. Cold sponging is usually just as effective and certainly much safer in the severe cases. Some authors recommend the cool bath, commencing with a temperature of 100° and reducing to 85°. This is seldom necessary.

If the rash is delayed, it may be hastened by the hot pack. This consists in wrapping the patient in flannel blankets which have been wrung out of hot water and covering them with mackintosh or dry blankets to retain the heat. With the free perspiration which results the eruption usually appears. The mustard bath (one tablespoonful mustard to a gallon of water) may be employed to produce the same effect. The patient is immersed in this for about three minutes

The cough is one of the most troublesome symptoms. It is usually controlled without much difficulty by small doses of paregoric, Dover's powder, codein or Brown mixture. The following prescription is much used:

Potassium citrate .....dr. 4
Camph. tinct. opium.....dr. 2
Lemon juice .....oz. 1
Syrup ipecac .....dr. 2
Syrup tolu, enough to make.....oz. 3
One-half to one teaspoonful every two to three hours.

When the cough becomes loose a little ammonium chlorid may be added to the expectorant mixture.

If the child is very restless or nervous, a small amount of

sodium bromid may be given alone or in combination, as in the following:

Tinct. aconite .....gtt. 8—16
Sodium bromid .....dr. 1½
Syrup ipecac .....dr. 2—3
Brown mixture.....oz. 2
Syrup lemon, enough to make.....oz. 4
Teaspoonful every two hours.

Vomiting is usually relieved by the application of a mustard draft to the epigastrium and the administration of bismuth or small doses of calomel, ipecac and soda. Milk and lime water in small quantities may help to settle the stomach. In malignant cases stimulants are required, as whiskey, brandy, ammonium carbonate, aromatic spirits of ammonia and digitalis.

The greatest care should be taken to prevent taking cold during convalescence. At this period the lung complications, which are justly much dreaded, are most frequent. Cod-liver oil, maltine, iron, quinin and strychnin are to be used whenever the condition of the patient shows the necessity.

MENINGITIS, CEREBRAL.

DEFINITION.—Inflammation of the membranes of the brain.

VARIETIES.—The common varieties are: (1) Pachymeningitis or inflammation of the dura mater, (2) leptomeningitis or inflammation of the pia mater and (3) tubercular meningitis (see Tuberculosis).

PACHYMENINGITIS.

ETIOLOGY.—*External* pachymeningitis is caused by injuries of the skull, caries of the bone or syphilis, with formation of pus; it is always acute. *Internal* pachymeningitis is usually chronic and may be caused by extension of inflammation from the pia mater, or from the middle ear by secondary infection in acute diseases, or it may follow syphilis, sunstroke, alcoholism, insanity, and kidney, heart or lung diseases. It is most frequently hemorrhagic (hematoma of the dura mater).

PATHOLOGY.—There is at first a hyperemia of the area supplied by the middle meningeal artery; there is injection and dilation of the blood-vessels of the dura mater, throwing out of an exudate on its inner surface and formation of new capillaries

which finally rupture and form hemorrhagic effusions which may be small or very large and cause considerable pressure.

SYMPTOMS.—The symptoms are often very obscure and may be insufficient for diagnosis. In a marked case there are headache, insomnia, loss of appetite, muscular weakness, vertigo, failure of memory, intellectual impairment, local convulsions, paresis and other symptoms due to pressure. In the acute form (external) there are chills, fever, etc. The disease often terminates in delirium, convulsions and coma. There may be apoplectic seizures.

DIAGNOSIS.—Very difficult in many cases and must often be made by exclusion.

PROGNOSIS.—Generally unfavorable, though the progress of the disease may be slow.

TREATMENT.—Acute manifestations of the disease should be treated like apoplexy—by ice-bags, leeches and counter-irritation to the head and hydragogue cathartics internally. Chronic cases should be put on the iodids or mercury. External pachymeningitis may sometimes be cured by surgical interference.

LEPTOMENINGITIS.

ETIOLOGY.—This may be caused by injuries to the skull, sunstroke, syphilis, caries of the bone (middle-ear disease), Bright's disease, gout and the acute infectious diseases. Tubercular meningitis is of this type (which see).

PATHOLOGY.—There is hyperemia of the vessels of the pia, a serous, fibrous and sometimes a purulent exudate is thrown out and the membranes become thickened and adherent. The adjacent cerebral substance is frequently infiltrated and congested. The disease may be confined to the base or to the cortex of the brain or may be generalized. It, however, exhibits a greater predilection for the cortex as compared with tubercular meningitis, which is more likely to attack the basilar membranes.

SYMPTOMS.—The symptoms are often not distinctive, but the following are most characteristic of the disease: There is usually dull, constant headache, persisting even during sleep, which, in the case of children, leads to a shrill, automatic cry (the hydrocephalic cry) and the placing of the hand upon the head. The head is often retracted, bored into the pillow,

and may be moved constantly from side to side; the child dislikes to be disturbed. The temperature varies greatly, but is usually moderately high (103° to 104° F.). The pulse is at first accelerated, but in many cases becomes very slow (40 to 50) and irregular. There is constipation, a coated tongue and frequently vomiting of the projectile type; this may be an early symptom. Delirium, insomnia, convulsions and unconsciousness sometimes occur. Other nervous symptoms are great sensitiveness to light and sound, hyperesthesia and particularly cranial tenderness, optic neuritis, etc. If there is disease of the basilar membranes there may be inequality or dilation of the pupils, strabismus, ptosis and facial paralysis. Symptoms appearing in the course of typhoid fever, pneumonia and influenza often simulate those of meningitis.

Diagnosis.—The most characteristic symptoms are the constant headache, the retracted head, slow pulse associated with high temperature and the eye symptoms (if present).

Cerebrospinal meningitis is more sudden and acute, and spinal symptoms are prominent (cervical pain, opisthotonos, etc.). Tubercular meningitis usually presents a tubercular history, prodromes, a slower course, a greater tendency to coma and basilar symptoms.

Cerebral symptoms in typhoid fever, pneumonia, etc., are secondary, but are nevertheless difficult of diagnosis. A study of the entire symptomatology will usually clear up the difficulty.

Prognosis.—Very grave. The disease usually causes death, but recovery sometimes takes place, though often with crippling of mind and body or loss of sight.

Treatment.—The treatment is symptomatic. The patient should be put to bed in a darkened room, placed in charge of a competent nurse and quiet enforced. The bowels should be moved with calomel and kept open during the course of the disease. The head should be shaved and an ice-bag applied. Blood may be abstracted by placing leeches behind the ears and counter-irritation made with mustard paste to the back of the neck. The temperature is reduced by cold sponging. Morphin may be required hypodermically for the relief of pain and chloral and the bromids may be given if there is great restlessness, nervousness or insomnia. The diet should

be liquid. If vomiting is troublesome a mustard paste to the epigastrium sometimes helps to quiet it. Mercury and the iodids are considered of most value to promote resolution.

MENINGITIS, TUBERCULAR—*See Tuberculosis.*

MENORRHAGIA AND METRORRHAGIA.

DEFINITION.—Unusual or excessive hemorrhage from the uterus. The term menorrhagia is applied to too profuse bleeding at the time of menstruation; metrorrhagia, to loss of blood between the periods.

ETIOLOGY.—The amount of blood lost at the menstrual period varies greatly in different women and irregularity in the appearance of the menses is not necessarily pathologic, so these terms are really relative. As a rule there is pelvic congestion and often subinvolution. The most frequent cause of both menorrhagia and metrorrhagia is endometritis, which frequently results from this condition of subinvolution. Other causes are lacerations of the cervix, fibroid tumors (especially submucous), ovarian and uterine disease and cancer. The possibility of the last named condition should always be considered if the woman is near the climacteric. The "change of life" is often associated with various uterine disturbances, including "flooding" or excessive loss of blood. This is not a necessary consequence of this transitional period in the woman's sexual life, as too many imagine, but always pathologic and demanding investigation.

TREATMENT.—Treatment should, of course, be directed to the cause of the loss of blood. Endometritis is usually most helped, often cured, by curettage. In mild cases caustic intrauterine applications, such as carbolic acid and iodin, may be sufficient, any associated congestion being reduced by the boroglycerid or ichthyol-glycerin wool tampon and the persistent daily use of the hot douche, at least three gallons of water being allowed to run slowly into the vagina with the patient in a supine position. Constipation should be corrected; preceding the expected period it may be expedient to deplete the pelvic vessels by several morning doses of a saline laxative (Epsom, Rochelle or Carlsbad salts). Lacerations must be

repaired, tumors removed and malpositions corrected. The patient should lead a hygienic life, eat nutritious food, wear loosely fitting, comfortable clothing and avoid nervous excitement, overwork and sexual excesses.

To relieve the hemorrhage or to anticipate it a number of drugs are found useful. The most active is probably ergot; ½ dram doses of the fluid extract or 2 or 3 grains of ergotin may be taken every two or three hours, alone or in combination with digitalis, viburnum, hydrastis, geranium, gallic acid and other drugs which have been used successfully in this condition. Ergot has the advantage of a tonic effect upon the uterine muscle, thereby helping to reduce subinvolution. A number of useful formulas follow:

Fl. ext. ergot	oz. 1½
Fl. ext. geranium	oz. 1
Fl. ext. hamamelis	oz. 1½

Teaspoonful every two or three hours.—Shoemaker.

Or—

Ergotin	gr. ½
Viburnin	gr. ¼
Helonin	gr. ¼
Hydrastin	gr. ⅛
Gallic acid	gr. 2

One tablet. One or two every three or four hours during flooding.

Fl. ext. hydrastis Can	oz. 2
Fl. ext. hamamelis	dr. 4
Fl. ext. ergot	dr. 4
Tinct. opium	dr. 1
Water	oz. 1

A teaspoonful every six hours before, during and after hemorrhage.—J. D. Eberts.

In cases associated with spasmodic pain the following will be found effective; it is to be taken during the attack:

Morphin sulphate	gr. 4
Fl. ext. ergot	oz. ½
Co. tinct. viburnum (N. F.), enough to make	oz. 4

Teaspoonful every two to four hours.

Stypticin (cotarnine hydrochlorate), one of the newer drugs, is highly recommended for this condition. According to Boldt it is very useful in uterine hemorrhages when there are no

demonstrable pathologic changes; also, in some hemorrhages due to changes in the uterine mucosa and those occurring after curettement. It is of no use when there are gross lesions of the endometrium. To secure immediate action 3 grains should be injected or one of Merck's tablets should be given every two hours, but not more than eight should be taken in twenty-four hours. Macnaughton Jones (Edin. Med. Jour.) recommends the following tablet containing it:

Hydrastin hydrochlorid	gr. $\frac{1}{3}$
Ergotin	gr. $\frac{3}{4}$
Cannabin tannate	gr. $\frac{1}{2}$
Stypticin	gr. $\frac{1}{4}$

To restore tone to the muscles and to the general system, in addition to the remedies already recommended, strychnin, quinin, iron, etc., may be indicated. These may be variously combined with ergot, hydrastis and similar drugs, as in the following:

Strychnin sulphate	gr. $\frac{1}{60}$
Ergotin	gr. 1
Hydrastin hydrochlorid	gr. $\frac{1}{4}$
Quinin sulphate	gr. 2

Organotherapy has also been applied to these cases. Tablets of mammary gland and suprarenal extract have been tried with asserted good results. The latter is a powerful astringent and should prove useful in these cases.

MENSTRUAL SUPPRESSION—See Amenorrhea.

MENSTRUATION PAINFUL—See Dysmenorrhea.

MILIARIA; "PRICKLY-HEAT."

DEFINITION.—Inflammation of the sweat glands, caused by excessive heat and characterized by the appearance on the skin of a large number of minute papules.

ETIOLOGY.—It is caused by overheating, especially when associated with excessive sweating. It is most common in infants and young children, the obese and those who indulge too freely in alcoholic drinks. Young children may be too warmly clothed. It is due to obstruction of the sweat glands and periglandular inflammation.

SYMPTOMS.—The eruption consists of a multitude of minute papules, pin-point to pin-head in size, closely set together but discrete, attacking all portions of the body but particularly the trunk, and attended by disagreeable sensations of itching, burning and tingling. In children it may be complicated with boils.

PROGNOSIS.—Favorable. The trouble disappears in a few days if the cause is removed.

TREATMENT.—Remove unnecessary clothing, keep in a cool place and avoid violent exercise which will promote free perspiration. Food should be light, easily digestible and unstimulating. Cooling acid or alkaline drinks, like lemonade or Apollinaris—but not ice cold, since that excites sweating—will be found agreeable to the patient. If there is constipation a saline laxative (Carlsbad or citrate of magnesia) should be given.

The local applications should be sedative. Borated or salicylated talcum powder, starch, lycopodium and the like are dusted on the skin or some soothing lotion may be applied, as a weak solution of alcohol, vinegar, sodium bicarbonate, borax or boric acid. If there is much itching the addition of a little carbolic acid will give some relief. Stelwagon recommends the following:

Carbolic acid	dr.	½—1
Boric acid	dr.	4
Glycerin	dr.	1
Alcohol	oz.	2
Water	oz.	14

MORBILLI—See Measles.

MUMPS; EPIDEMIC PAROTITIS.

DEFINITION.—An acute contagious disease characterized by inflammation and swelling of the parotid and sometimes of the other salivary glands.

ETIOLOGY.—Mumps occurs both endemically and epidemically. It is most common in late winter and early spring, occurs most frequently in children, and in males twice as often as in females. The disease is very contagious, but no specific germ has as yet been positively identified. The saliva probably conveys the contagion, but it may be communicated by the breath

and exhalations, or carried upon the clothing. One attack usually gives protection.

PATHOLOGY.—The morbid process consists of an inflammation of the periglandular structures of the parotid gland, with serous infiltration. It probably commences in the ducts. Suppuration is rare. The testes of the male or the ovaries or breasts of the female may undergo secondary inflammation.

SYMPTOMS.—The *period of incubation* averages about two weeks, but may be some days longer or shorter. It commences with malaise, slight chilliness and feverishness. The temperature seldom goes above 101° F. There is often headache, restlessness and vomiting. These symptoms are soon followed by pain and swelling in front of and beneath the ear due to inflammation of the parotid gland. This usually commences first in one gland, increases in severity for two or three days, when it reaches its climax, then appears in the other gland. Only one side may be attacked or both simultaneously. The pain is increased by attempts at swallowing, especially of acids; mastication may be impossible and talking exceedingly difficult and painful. In many cases there is severe earache caused by the pressure of the swollen gland, and there may be ringing in the ears, partial deafness and nosebleed. The affected gland is usually extremely tender. In severe cases the other salivary glands may partake of the inflammatory process, the neck becoming enormously swollen and the face distorted by localized edema. The salivary secretion is generally increased. The course of the disease in an ordinary case is about a week, but there are often recurrences, and resolution of the enlarged glands may be slow.

COMPLICATIONS.—Before puberty complications are rare. After that period secondary inflammations of the testicles in males and of the ovaries and mammæ in females are not infrequent; vulvo-vaginitis may also occur. These complications appear after the inflammation in the salivary glands has subsided. While very painful and distressing they are rarely dangerous to life. Orchitis may cause atrophy of the testicles.

Otitis media, meningitis, peritonitis and nephritis are rare complications.

DIAGNOSIS.—The only condition with which mumps is likely

to be confused is infective inflammation of the parotid. This usually results in suppuration; it is very rare.

PROGNOSIS.—Always favorable as to life in uncomplicated cases. Atrophy of the testicles, ovarian disease and permanent deafness may be sequences.

TREATMENT.—The disease is a self-limited one and its course is not greatly modified by treatment. This is addressed chiefly to making the patient more comfortable. He should be kept warm in bed and placed on a liquid diet. If the bowels are constipated several small doses of calomel should be administered, followed by a saline laxative as Rochelle salts or a natural aperient water. Tincture of aconite is given in a simple fever mixture if there is appreciable rise of temperature. Headache is relieved by acetanilid or phenacetin; the migraine pill is a reliable mode of administering the former. In order to prevent secondary infection an antiseptic mouth wash and gargle is useful, as the following:

Boric acid	dr. 1
Tinct. myrrh	oz. 1
Listerine	oz. 1
Glycerin	oz. 1
Water, enough to make	oz. 6

Either hot or cold applications may be made to the inflamed gland, as preferred by the patient, but heat is generally more agreeable, used in the form of compresses or linseed poultices. They should be covered with an impervious material to retain the heat, and laudanum may be added to the poultice, if required by the severity of the pain. In most cases hot camphorated oil, to which a little turpentine may be added in the case of adults, answers every purpose. After applying it the face should be covered with cotton-wool and bandaged. Ichthyol locally gives decided relief. A formula recommended by Franchet is:

Ichthyol	gr. 45
Lead iodid	gr. 45
Ammonium chlorid	gr. 30
Lard or vaselin	oz. 1

Belladonna may be added to this if thought to be of advantage.

The mixture of silicated earth and glycerin, known as antiphlogistine, should be useful as a local application. It should be applied hot.

Care should be taken during convalescence to avoid exposure; this is popularly believed to be the exciting cause of the complicating cases of orchitis, ovaritis, etc. If orchitis develops the inflamed testicle should be supported on a platform made by passing a wide strip of adhesive plaster across the thighs. Hot compresses may be applied or the ichthyol ointment given above. A mixture of equal parts of guaiacol and glycerin is also recommended for local use. Rest in bed and hot compresses are usually all the treatment required in ovaritis or mastitis. Belladonna ointment may be applied in severe cases.

MYELITIS.

DEFINITION.—Inflammation of the spinal cord.

VARIETIES.—The disease may be either acute or chronic. If a transverse section of the cord is affected it is called transverse myelitis; if a considerable vertical section, diffuse; if lesions appear at different points in the cord, it is disseminated; when the gray matter of the cord is involved it is central; when the white matter and meninges, it is known as cortical myelitis.

ETIOLOGY.—Myelitis may be caused by injuries; by exposure to wet or cold; by spinal caries, as in Pott's disease; by tumor growths; by the infectious diseases, as typhoid fever, diphtheria, variola, puerperal fever, influenza, etc.; by alcoholism; or by constitutional diseases, like syphilis, tuberculosis, carcinoma and gout.

PATHOLOGY.—In the acute form the cord is swollen, soft to the touch and the line of demarcation between the white and gray matter is less distinct than normally. The vessels are engorged and there may be punctate hemorrhages. The diseased area is red, yellow or white, according to the degree of vascular injection and the amount of degeneration. The central gray matter may break down, forming small cavities. The nerve cells degenerate and the nerve fibers are at first swollen and then become atrophied and interrupted. In the chronic form there is an increase in the quantity of connective tissue and the cord becomes hard and resistant, or fatty degeneration may take place.

SYMPTOMS.—The onset of the disease may be gradual, but

is more likely to be sudden, with chills, fever (101° to 103° F.), a rapid pulse, backache, muscular pains and general malaise, resembling in some respects a rheumatic attack. Some muscular weakness will soon develop, there may be cramps or spasms of the muscles, sensations of crawling, tingling or burning will develop and there will be "girdle pains" around the body at the level of the lesion, and also around the affected limbs. Finally there will be complete paralysis and anesthesia of the muscles supplied by the diseased nerve center. These symptoms, in an acute case, run a rapid course and may be fully developed within a few days, or they may become chronic, the disease lasting for months or years.

The dorsal portion of the cord is most frequently attacked; in these cases the lower limbs are principally affected. If the cervical cord is attacked there is paralysis of the upper extremities and frequent interference with respiration. Usually the muscles supplied by the unaffected portion of the cord below the lesion do not give the reaction of degeneration or become atrophied, and the reflexes are increased; but if the lumbar portion of the cord is involved, primarily or by downward extension, the reflexes are abolished and frequently there is incontinence of feces and urine, which are passed unconsciously on account of the absence of sensation. This is usually a late symptom, but may, in rare instances, occur early when the primary seat of the disease is in the lumbar portion of the cord. The condition of the paralyzed patient is now most deplorable and is made worse, in many instances, by superficial ulceration of the skin, the formation of bed-sores and cystitis.

Acute central myelitis is the most rapid in its development and course, paralysis appearing within an hour or two followed by delirium, sometimes convulsions, very high fever and death.

Prognosis—Unfavorable. In central myelitis death often occurs within a week, or if the lesion is ascending a fatal termination, occurs within a short time from paralysis of the heart and respiration. On the other hand, the descent of the disease into the lumbar portion of the cord entails, in addition to the paralysis, loss of power over the bladder and bowels, making the patient an offense to himself and his friends—a condition of living death, which in the chronic form may last for years.

Recovery does sometimes occur, but with permanent disability on account of destruction of portions of the cord.

TREATMENT.—The treatment is purely symptomatic and offers little promise of cure. At the beginning of an acute attack, cups may be applied to the spine over the affected area, or an ice-bag may be tried. Severe counter-irritation is contra-indicated on account of the danger of bed-sores. If there is a suspicion of syphilis, potassium iodid should be administered in full doses. Perfect rest is the most useful remedy. The patient should be placed on a water-bed and a careful watch kept for commencing trophic disturbances. Attention to cleanliness and equalization of pressure will usually prevent these, but if they occur they should be treated as elsewhere directed (see Bed-Sores). The bladder should be frequently emptied with the catheter and the bowels kept rather constipated by a suitable diet. Mercury, ergot, quinin, etc., are sometimes considered useful. Massage, electricity and strychnin may help to prevent atrophy of paralyzed muscles or to restore them in case of recovery.

MYOCARDITIS; DEGENERATION OF THE HEART.

DEFINITION.—An inflammation of the muscle substance of the heart.

VARIETIES.—It may be acute or chronic.

ACUTE MYOCARDITIS.

ETIOLOGY.—The usual cause of myocarditis is endo- and pericarditis. It may also result from the infectious processes of infectious diseases. The septic material may be carried to the muscle substance by septic emboli through the coronary arteries. A thrombus may cut off the blood supply, producing local inflammation.

PATHOLOGY.—In myocarditis the cavities are usually dilated, while the muscle is soft and friable and pale or yellowish-red in appearance. There is granular degeneration of the muscle fibers and sometimes round-cell infiltration of the connective tissue. In some cases abscesses may occur varying in size from a pinhead to that of a cherry. These may rupture into one of the chambers or into the pericardial sac, establishing a

fistula. If the fistula leads to the heart cavity the blood enters and forms an aneurysm or else forces its way further through the wall into the pericardial sac, causing immediate death.

SYMPTOMS.—The symptoms are very obscure. They are principally those of great feebleness of the heart. During convalescence or while still quite ill from the infection there may be a feeling of weight over the precordia and some dyspnea. The pulse becomes rapid, feeble, easily compressible and sometimes irregular. The patient may sigh frequently and have fainting attacks. Cold extremities and pallid face may be further proof of a feeble circulation.

Physical Signs.—The heart impulse is scarcely perceptible and may be absent altogether. If dilation occurs simultaneously the area of dulness is likely to be increased. The heart sounds are feeble.

PROGNOSIS.—The prognosis is grave. The disease may have a sudden fatal termination, especially in the diffuse form. If the inflammation is only circumscribed recovery may ensue.

TREATMENT.—The treatment is practically the same as in acute endocarditis. Absolute rest is required, together with a nutritious diet, consisting of easily digested food. Strychnin and the diffusible stimulants may be used as indicated. Digitalis, in order to do good, must have a heart-muscle that is able to work and is here of little if any use.

CHRONIC MYOCARDITIS.

ETIOLOGY.—Chronic myocarditis may result from chronic endo- or pericarditis. It is usually associated with atheroma. The etiological factor may be rheumatism, gout, diabetes, chronic nephritis, lead poisoning or the excessive use of alcohol or tobacco.

PATHOLOGY.—The interstitial connective tissue is greatly increased. This may be general or only circumscribed. In the latter condition the muscle presents small areas having a white, shining appearance. In these cases the muscle has been fully or partly replaced by fibroid tissue. The heart is generally hypertrophied, but not infrequently the muscle fibers are atrophied and found to have undergone granular or fatty degenera-

tion. This is usually an arteriosclerosis of the coronary arteries the result of an endarteritis.

SYMPTOMS.—The symptoms may be masked by those of a primary disease, or if the fibroid changes are slight they may not be discoverable. Among the earliest are dyspnea on exertion, oppression over the precordia and palpitation.

In cases of atrophy, the pulse is unusually slow, sometimes not more than 30 to 40 beats a minute. It is feeble in most cases and may be irregular or intermittent. In fatty degeneration there is an increase of symptoms denoting failure of the circulation. When the right heart is failing venous stasis, cyanosis and congestion of the various internal organs may appear. Angina pectoris is occasionally a symptom, while pseudo-apoplectic seizures may occur with fatal result.

PHYSICAL SIGNS.—The impulse is feeble and occasionally absent, while there is an increased area of dulness downward and to the left. The heart sounds are apt to be weak and muffled. Late in the disease there may be a systolic murmur at the apex, with galloping rhythm of the heart.

DIAGNOSIS.—The diagnosis is commonly difficult. It may be necessary to study a case for some time before a correct conclusion can be reached. It must be distinguished from fatty overgrowth of the heart. The latter condition occurs generally in brewers, saloon-keepers, heavy beer-drinkers or in those with marked obesity.

PROGNOSIS.—Chronic myocarditis is generally fatal. Sudden death may result. The patient may, however, live for many years in mild cases.

TREATMENT.—This varies but little from that of valvular disease. Much attention should be paid to hygienic and dietetic measures. Overexertion should be carefully avoided, but judicious exercise is important. Upon signs of approaching failure rest should be strictly observed and only a light diet allowed.

Strychnin is perhaps the most useful of drugs in this condition for the purpose of stimulation. Arsenic given for some time may be useful. Potassium iodid offers perhaps the greatest hope of removing or checking the fibroid growth, but must be given for a considerable period to accomplish much good. In case of an attack of angina pectoris the treatment mentioned

under that subject should be adopted. If the disease is due to the excessive use of tobacco or alcohol the causative agent should be at once strictly prohibited. In cases with urgent symptoms the diffusible stimulants may be employed.

MYXEDEMA.

DEFINITION.—A nutritional disease due to atrophy and loss of function of the thyroid gland and characterized by tissue infiltration and mental disturbance.

ETIOLOGY AND PATHOLOGY.—Myxedema occurs much more frequently in women than in men, is sometimes hereditary and is often associated with a neurotic temperament. Menstrual disorders and emotional disturbances are believed to be exciting causes in some instances. It sometimes follows exophthalmic goiter. Rheumatism, erysipelas, actinomycosis and syphilis have been cited as other causes. Myxedema usually appears at middle age. The symptoms of the disease are in many instances increased in severity by damp and cold. A form of the disease seen in young children and often congenital is known as *cretinism*. Myxedema follows complete operative removal of the thyroid gland.

The cause of the disease is undoubtedly the lack of the secretion of the thyroid gland; that organ is either atrophied or entirely absent. In most cases the glandular structures of the atrophied organ are found to be replaced by connective tissue. The subcutaneous tissues are infiltrated with a mucus-like substance which changes the natural outlines of the body.

SYMPTOMS.—The infiltration of the tissues adds to the bulk of the body and gives it an appearance of heaviness and coarseness. This is especially apparent in the face, which appears puffy, swollen, and expressionless; the upper lids droop, the nostrils are broadened, the nose flattened and the lips thick. The hands are broad and spade-like, the abdomen enlarged and pendulous. The skin is dry, rough, harsh and resistant and does not pit on pressure; the hair is lusterless, breaks off and falls out; the nails are brittle. The mucous membranes are pale in color and also infiltrated. The tongue is enlarged; the lips and cheeks thickened; the gums spongy and inclined to bleed; the teeth are loosened and break off easily. Speech is slow,

difficult, harsh and the enunciation indistinct; it is often jerky and nasal in tone. There is more or less gastro-intestinal disturbance. Usually there is marked muscular weakness and an unsteady and heavy gait. There may be vertigo.

Patients often complain of occipital headache. The temper is fitful and irritable and there is often excitability. The mental faculties are dull, memory is impaired, thought slow and there may be a condition of intellectual apathy. At other times speech is voluble. The special senses are occasionally very acute but the sensation of touch is generally obtuse; the patient often fumbles and drops small objects.

The temperature is often subnormal. The quantity of urine is diminished and the excretion of urea is often decreased by half. The urine may contain albumin or sugar.

Sporadic Cretinism in children is marked by a large head, full expressionless face, a swollen protruding tongue, short neck, enlarged, protuberant abdomen and defective development, mental and physical. The child is slow about learning to walk and talk, articulates with difficulty, does not increase much in size and remains in a condition of comparative idiocy.

DIAGNOSIS.—Myxedema may be distinguished from the edema of cardiac or renal dropsy by the fact that the skin does not pit on pressure, by the characteristic facies and the absence of the physical and urinary signs of these diseases.

In akromegaly the bones are elongated and the tissues are not swollen and infiltrated.

PROGNOSIS.—The course of the disease is slow but progressive unless modified by treatment. It was formerly thought to be invariably fatal, but since the introduction of thyroid it has been shown to be very amenable to treatment.

TREATMENT.—The thyroid gland of the sheep or calf is now considered a specific for myxedema. The gland itself either raw or partially cooked was formerly given; at present the glycerin extract or the desiccated thyroid is depended upon. The average dose of the former is 15 to 30 minims three times a day, but it is wise to commence with a smaller dose and gradually increase it until the desired results are obtained. The desiccated thyroid is given in 3 to 5 grain doses either in powder or tablets. The remedy very soon spoils and should be procured

as fresh as possible. An active principle, known as iodothyrin, has been extracted from the gland and is said to produce all its good results with less of the attendant disagreeable symptoms. The dose is one-half gram (7½ grains) daily.

Under the use of the thyroid preparations the patient soon undergoes remarkable improvement. The fullness of face and figure disappears and the body reassumes its normal outlines; there is increase of muscular strength, mentality improves and the whole individuality is changed for the better. These changes are most marked in congenital cretins, in whom there is also increase of stature, ability to walk and talk and wonderful development in intellectual power. The effects of treatment are apparent in a few weeks, but it must be continued for months; the remedy must indeed be given intermittently as long as the patient lives.

Thyroid must be given cautiously, since it sometimes produces troublesome symptoms, including cardiac palpitation, syncope, flushing of the face and disturbance of digestion. If these occur markedly it is necessary to discontinue its use temporarily or give it in smaller doses. Murray found that these results were prevented or minimized by giving the daily quantity of the remedy in a single dose at bedtime. The combination of arsenic in the prescription decreases the disagreeable effects of the thyroid. Strychnin and nitroglycerin may be required for the relief of these symptoms.

Pilocarpin was the favorite remedy for myxedema before the introduction of thyroid.

Residence in a warm, equable climate is desirable. Massage, electricity and hydrotherapy are useful adjuvants to the thyroid treatment.

NEPHRITIS; BRIGHT'S DISEASE.

Definition.—An inflammatory disease of the kidneys, either acute or chronic, characterized by the presence of albumin in the urine.

Varieties.—For practical purposes three varieties are usually described: (1) Acute nephritis; (2) chronic parenchymatous or diffuse nephritis; (3) chronic interstitial nephritis or con-

tracted kidney. More extensive and minute classifications are sometimes made.

ACUTE NEPHRITIS.

ETIOLOGY.—Acute Bright's disease is caused by chilling of the skin, by exposure to wet or cold; it occurs in the course of the contagious or infectious diseases, such as scarlet fever, diphtheria, smallpox, typhoid fever, cholera, yellow fever, meningitis, erysipelas, septicemia, dysentery, tuberculosis, and pneumonia; it may follow the ingestion of toxic drugs, as turpentine, cantharides, carbolic acid, and chlorate of potassium; sometimes it complicates pregnancy. Whatever the exciting cause, it is produced by the excretion of an unusual quantity of irritant matter by the kidney. These poisons may be produced in excess during disease, may form in the alimentary canal or may consist of natural excretory elements which are forced to find an exit through the urinary tract because other bodily functions are poorly performed—notably those of the skin and bowels. It is probably true that a very large percentage of these cases are really due to the intestinal poisons which result from an improper quantity or character of food, or stimulant drinks, and are simply precipitated by the exciting cause, whether that be a chill or an attack of scarlatina.

PATHOLOGY.—Two types of kidney are seen; first, the bright red; second, the pale, mottled organ. These represent different degrees of hyperemia rather than difference in the nature of the disease. The latter form is usually a later stage. As a result of the inflammatory process the organ becomes swollen and hyperemic, the cortex paler and less affected than the medullary or secretory portion, the Malpighian tufts still retaining their color. The capsule is loose and easily stripped off. The effect of the renal irritant is shown primarily by the change in the epithelium of the glomeruli and uriniferous tubules, which early show cloudy swelling and later in the disease fatty degeneration. This cellular degeneration is likely to be especially severe in the glomeruli, which bear the first brunt of the attack. Later the tubules are filled and blocked with an exudate of desquamated epithelium, red corpuscles and granular matter, thus impeding the passage of fluids through the organ and

causing retention of the toxins. The renal circulation is checked, the capillaries become dilated and their walls degenerate resulting in multiple points of hemorrhage. There is more or less infiltration into the interstitial tissues with its consequent results.

SYMPTOMS.—Acute Bright's disease usually commences suddenly, soon after chilling of the skin, in the course of some other disorder or without appreciable cause. The rapidity of its development depends upon the acuteness of the cause. Chilliness, slight atypical fever, nausea, and vomiting are early symptoms. Dull pain in the lumbar region and tenderness on deep pressure are commonly present. In children there may be convulsions. Dropsy soon appears—in twenty-four hours in some cases. This may be the first symptom to attract attention, although on close inquiry a history of gastric disturbance and scantiness of urine will usually be found. The edema is first noticed in the eyelids as a slight puffiness; next it appears about the ankles and legs, and in severe cases may affect the whole body. In such cases the scrotum, penis and labia become enormously distended. The pulse is usually slow, often of high tension. It may be accelerated later in the disease. The skin is constantly dry and hot and may become tense from dropsical stretching. In most cases the symptoms finally subside and complete recovery follows, but uremic disturbances develop in a few of the graver cases. These are ushered in with severe headache, restlessness, muscular twitching, and terminate in convulsions, which often are followed by mental stupor, coma and death. Micturition is increased in frequency and may be associated with slight burning and vesical tenesmus. The quantity of urine is diminished, varying from 5 to 25 ounces. Sometimes there is entire suppression. It is high-colored—smoky-red from staining with blood. The specific gravity is 1025 or more, and there is a deposit of flocculent precipitate. Examination shows the presence of albumin (¼ to 1 per cent), a decreased amount of urea, and red corpuscles, epithelium and casts (hyaline, blood and epithelial).

PROGNOSIS.—Favorable in most cases. Nine-tenths recover; a few develop uremic poisoning and die; a few others become chronic and finally succumb.

TREATMENT.—The indications for treatment are (1) to prevent any further increase of the supply of toxins in the circulation; (2) to increase their excretion. It is therefore important to maintain the other excretory functions in the best condition possible. The patient should be confined to bed in a warm room, placed between woolen blankets, and wear woolen underwear to prevent chilling of the body and throwing into the circulation the toxins normally excreted by the skin.

It is of vital importance to keep the intestinal tract in good condition. The influence of improper diet in the causation of the disease is generally recognized. All foods or drinks which are likely to develop irritants should therefore be stopped at once. During the first twenty-four hours it is well to withhold food entirely. Milk is by far the best article of diet. It should be given unskimmed, but diluted with lime water, Apollinaris, Vichy or other carbonated water, and sipped or taken from a spoon. Two to three quarts should be given daily. In place of this, buttermilk, koumiss or the various gruels may be used. In the rare cases where the patient refuses milk alone he will often take it when given with the farinaceous foods, as rice, cornstarch, tapioca, toasted bread, macaroni, etc. In case of necessity these may be given alone, but avoid mixing different articles of food, since this increases the tendency to fermentation. The meat broths, extracts, teas, etc., should never be given on account of the extractives which they contain. Tea, coffee and alcoholics should be absolutely forbidden.

The second indication is met by restoring the equilibrium of the circulation in the congested kidney, which is hyperemic and swollen and its tubules choked with debris. Stimulation of the bowels and skin aids in the relief of this hyperemia and disposes of some of the accumulated toxins. Early in the disease free catharsis should be produced by an initial dose of calomel (5 to 10 grains), or, if the stomach is irritable, the same effect will be produced, with improvement to the gastric symptoms, by administering it in small doses ($\frac{1}{8}$ to $\frac{1}{4}$ grain) hourly until relief is obtained. If the symptoms are urgent and indicate uremia, croton oil (2 drops) or elaterium ($\frac{1}{4}$ grain) may be given. Calomel should be followed by a saline. A bottle of the Effervescing Solution of the Citrate of Magnesia given cold

in two to four doses every one-half hour is agreeable when the stomach symptoms are troublesome. The cathartic effect should be maintained throughout the course of the disease by the administration every morning of a saline (cream of tartar, citrate of magnesia, Rochelle or Epsom salts) in concentrated solution.

If the pain in the back is severe hot wet compresses or a hot poultice should be applied over the lumbar region. Elimination of the retained urea and relief from the edema is best attained by free perspiration. This is brought about with the least depression by use of the hot-pack. A narrow cot is covered with a rubber cloth and a dry warm blanket; over this is laid another blanket wrung out of hot water. The patient is wrapped closely in this, all but the head, and then surrounded with the dry blanket. Hot water bottles, hot ears of corn, bags of sand or salt, or any other convenient articles that will retain heat may be laid around to maintain the temperature. Diaphoresis is further promoted by giving hot drinks, such as hot lemonade. The patient should be kept here for an hour or more, when the coverings are gradually removed, the skin dried with friction, great care being taken to avoid chilling the surface. As a substitute for this procedure a hot general bath may be administered, or a hot vapor bath with one of the numerous household appliances. This may be extemporized by placing the patient under a frame covered with blankets, under which the steam from the spout of a tea kettle may be conducted. If these measures are not successful, perspiration may be started by the hypodermic injection of pilocarpin ($\frac{1}{8}$ to $\frac{1}{6}$ grain) remembering its depressing effect and watching heart and pulse. It is a good plan to produce sweating and catharsis on alternate days when dropsy is great.

To directly unload the kidney and flush the tubules of debris, diuretics are indicated. An abundance of fluids should be given, milk being the most useful agent of this class. The alkaline mineral waters are of special value and the patient should be encouraged to drink them freely. The citrate, acetate or bitartrate of potassium are useful agents in this connection and 15 to 20 grains of either of these may be given every two or three hours. An agreeable cream of tartar lemonade may be made

by dissolving the drug in hot water, adding lemon juice and sugar and allowing it to cool. Digitalis is usually considered the best diuretic; it acts as such probably by raising arterial pressure in the kidney. It is doubtful, however, if this drug is indicated when the tension of the pulse is already high, and it is possible that it may add to the hyperemia and do harm in such a condition. During such a condition nitroglycerin (1/100 grain) should be useful. When the tension is low digitalis is undoubtedly extremely useful. It is best given in the form of the infusion with the alkaline diuretics, as, for example:

Infus. digitalis .....dr. 2
Potass. citrat. .....gr. 15—30

Give this dose every two to four hours.

For uremic symptoms the same general system of treatment is indicated, but it must be carried out rapidly as required by the emergency. The hydragogue cathartics (croton oil or elaterium) should be administered at once. In addition to the sweating, wet or dry cups may be applied over the lumbar region and bleeding is justified. Applications to the lumbar region of compresses wet with a hot infusion of digitalis are sometimes effective. In case of convulsions hypodermics of morphine, inhalations of chloroform or enemas of chloral (1 dram to 4 ounces of water) are indicated.

During convalescence care should be taken not to expose the patient to the cold. The feet should be kept dry and sudden changes of temperature avoided. The diet should remain simple and milk should be the principal dependence. Ammonia calls for iron, Basham's mixture being a favorite form for its administration. For instance:

Sp. ammon. aret. .....oz. ½
Aq. dest. .....dr. 5
Tr. ferri chlor. .....dr. 5
Glycerin .....oz. ½
Syrup .....oz. 4
Water .....oz. 4

CHRONIC PARENCHYMATOUS NEPHRITIS.

Etiology.—This occasionally follows the acute form, but usually develops insidiously without evidence of preceding kidney disease. It occurs more often in males than females and

especially in young adults. Beer-drinkers and persons accustomed to the use of malt and spirituous liquors are peculiarly subject to the disease. The influence of free living, and especially of an overtaxed digestive system, should be kept in mind and also the fact that the disease is common when there is prolonged mental strain. The cause may be found in tuberculosis, syphilis or chronic suppuration; in such cases it is usually associated with amyloid disease.

PATHOLOGY.—There are several types of kidney belonging to this form of Bright's disease; but in all, the essential change is in its cellular portion.

In the large white kidney the organ is enlarged, the capsule nonadherent and the cortex broad and pale, presenting opaque light-colored areas. The pyramids may be congested. Microscopically it is found that the renal epithelium has not simply undergone cloudy swelling, as in the acute form, but has become fatty and granular, is flattened and is often detached. The glomeruli are enlarged, their capsules thickened, and the tuft of capillaries atrophied. There is some thickening of arterial walls and infiltration into the intertubular substance.

The small white kidney is probably a second stage of the preceding. Here the organ has become shrunken to about its normal size, the surface is irregular and capsule adherent. In color it is pale and the cut surface presents patches of fatty degeneration. The connective tissue has increased in quantity and by shrinkage causes atrophy of the convoluted tubules and glomeruli, whose epithelium has undergone extensive degeneration. There may be waxy degeneration. This is the most common form.

There is a third form in which the kidneys are large, congested and hemorrhagic. The cut surface shows both congested and fatty patches and numerous red spots due to small hemorrhage. The cellular changes are similar to those in the large white kidney. This form is frequently seen in alcoholics.

SYMPTOMS.—The symptoms appear slowly and insidiously. There is usually a gradual loss of health and strength, anorexia, derangement of digestion, headache, mental heaviness and anemia, giving a marked "pasty" cachexia to the skin. Dropsy first appears in the face, with puffiness about the eyelids, and

soon after in the ankles and legs. This puffiness increases during the day and may be absent on rising in the morning. The edema is persistent and gradually extends all over the body, finally invading the abdomen and chest. Dyspnea occurs from the invasion of toxins, the pressure of the fluid and the failure of the heart's action due to overwork. The tension of the pulse is high, with accentuation of the aortic second sound. Cardiac hypertrophy results and later there may be dilation of the ventricles. Acute attacks may occur at intervals from an exacerbation of the disease. Uremic symptoms may occur at any time with headache, vertigo, sleeplessness, nausea, diarrhea and stupor. These often indicate an early fatal termination.

In the majority of cases the quantity of urine is diminished to from ½ to 2 pints. In later stages when the kidney has become contracted the amount may equal or exceed the normal quantity. It is usually smoky and high-colored. Albuminuria is marked and the quantity of albumin may constitute 25 to 75 per cent of the urine by volume or 1 to 3 per cent by weight. The specific gravity is high (1025 to 1040) during the early stages but may fall when the quantity is increased. The quantity of urea is diminished. There is a considerable precipitate, consisting of casts, blood corpuscles, epithelium and granular debris. The microscope shows hyaline, granular and epithelial casts.

Prognosis.—The prognosis is unfavorable, although there are some rare cases of recovery. Death usually occurs within one to three years.

Treatment.—The treatment of chronic parenchymatous nephritis is conducted upon the same general principles as that of acute nephritis. Rest, mental relaxation and a properly adjusted diet are essential. Acute attacks should be treated, as already indicated in the preceding article, with rest in bed, free catharsis and diaphoresis, and a restricted milk diet. An exclusive milk diet, however, cannot be maintained throughout the disease on account of its duration. N. S. Davis, Jr., recommends for the numerous mild cases either a modified or mixed milk diet. In a modified milk diet milk is the basis; bread, starches, fruits and vegetables are included, while meats, fish and eggs are excluded. In a mixed diet eggs and selected kinds

of meat and fish are allowed in limited quantity, and milk and farinaceous foods are still made the dietary foundation. All meats rich in extractives, meat extracts and bouillon are proscribed. Fresh eggs and fish, breast of chicken, squab, ham, cold pork, lamb and oysters come next in order of innocuity. Beef, mutton, game and the coarser fish are forbidden, as well as alcohol, tea and coffee. The physical condition and previous habits of the patient must, however, be consulted. If there is anemia and debility the opinion is growing among physicians that a more generous diet, including lean meat, should be allowed.

It is necessary to keep the skin in a state of high efficiency, so the clothing should be warm, chilling of the skin avoided and the winters spent in a warm climate when possible. The bowels should be moved daily, the saline mineral waters being especially valuable for this purpose. Diuretics are useful and may be prescribed with laxatives or with iron when made necessary by the anemia, as in Basham's mixture (see Acute Nephritis), or the following:

Iron and ammonium citrate	gr. 6
Potassium citrate	gr. 20
Syrup orange	m. 30
Water, enough to make	oz. 1

This dose three times a day after meals.—Bruce.

Or—

Strychnin sulphate	gr. $\frac{1}{4}$
Tinct. chlorid of iron	oz. $\frac{1}{2}$
Acetic acid	dr. $1\frac{1}{2}$
Curacoa	oz. 1
Sol. ammon. acetat., enough to make	oz. 6

A tablespoonful, followed by a glass of water, every four hours.—Hughes.

The high tension pulse is due to the narrowing of the vascular channels in the kidney whereby the heart is made to act with greater force to maintain renal compensation. This in itself may prove a danger, causing rupture of weakened vessels in the brain or retina. To obviate this, take as much work off the kidney as possible, as already indicated; administer nitroglycerin ($^1/_{100}$ grain), the nitrites, or potassium iodid. These drugs dilate the capillaries and relieve cardiac strain. If the

heart's action becomes weak, administer strychnin or digitalis. The latter drug is an effective diuretic and may advantageously be combined with potassium iodid. The lactate of stronium, given in solution (15 to 20 grains) three or four times a day, is a useful diuretic. Uremic symptoms are treated as described under acute nephritis.

CHRONIC INTERSTITIAL NEPHRITIS.

ETIOLOGY.—Interstitial nephritis occurs more commonly in males than females and usually makes its appearance during middle life, from the fortieth to the sixtieth year. Among the causes are lead poisoning, syphilis, alcoholism and prolonged anxiety or nervous tension. Probably the most productive element in its causation is the so-called gouty diathesis, the result of habitual indulgence in rich nitrogenous foods, alcoholic liquors and other articles that contain or produce chemical combinations of the uric-acid type. A diet of this class tends to produce a sclerotic condition of the arteries—a predisposing condition.

PATHOLOGY.—The kidneys are greatly reduced in size and weight. They may be only one-half or one-third the normal bulk and weigh only an ounce to an ounce and a half each. They are reddish in color, with surfaces irregular and capsules thickened, opaque and adherent. Occasionally small cysts are present. The cut surface shows the cortex to be greatly reduced in thickness. Microscopically the greatest change is found to be in the increased amount of connective tissue, especially in the cortical portion. By the contraction of this tissue the glomeruli and tubules are greatly compressed and in places entirely obliterated. The tubular epithelium undergoes granular, fatty or waxy degeneration. An essential feature is the sclerotic condition of the renal arterioles, caused by the growth of fibrous tissue in their walls. This often is the primary condition leading to the contracted and degenerative condition of the organ. Cardiac hypertrophy is a constant result of this condition.

SYMPTOMS.—The early symptoms of contracted kidney are exceedingly obscure. The disease develops so insidiously that it may exist a long time, years perhaps, before its presence is

recognized. One of the earliest symptoms is the increased frequency of urination. There are ill-defined nervous symptoms, more or less indigestion and gradual loss of strength and weight, without apparent cause. The complexion becomes muddy and the patient complains of insomnia, headache, stupor and loss of memory. Disorders of vision, amounting to sudden loss of sight, may occur. There is a slight puffiness of the eyelids and edema of the ankles, coming on during the day and disappearing at night, but there is no pronounced dropsy. The arteries are rigid and the pulse firm and tense. The graver renal symptoms may make their appearance during the course of some complicating disorder, such as pericarditis or pneumonia, but often occur without apparent cause in the shape of a distinct uremic seizure. This appears with severe headache, nausea and vomiting, dyspnea, convulsions, stupor and coma, to which the patient may succumb.

The quantity of urine is increased. It is pale in color, of low specific gravity (1005 to 1010), and contains little or no sediment. There is usually a small amount of albumin, but this may be entirely absent. There may be found a few narrow hyaline casts, perhaps some leukocytes, and occasionally a few red corpuscles. The quantity of urea is diminished.

Among the grave symptoms are nose-bleed, retinal hemorrhage, cerebral hemorrhage, edema of the larynx, and dyspnea, either uremic or cardiac. Examination of the heart shows cardiac hypertrophy. Finally the heart may become dilated and the symptoms of cardiac dropsy are added to those of the uremic condition.

PROGNOSIS.—This is an extremely chronic disease and may last five to thirty years, or the patient may succumb to an intercurrent malady. It eventually terminates fatally.

TREATMENT.—The treatment should be essentially dietetic and hygienic. This includes careful regulation of habits, exercise, clothing and occupation. The arterial changes and the underlying lithemia should be kept in mind and are usually the best guide to treatment. These patients are usually high livers, accustomed to sedentary habits and over-indulgence in heavy nitrogenous food, rich and highly seasoned sauces, gravies, condiments, pastries and made-dishes. As a rule they drink

little bland liquid with the meals unless it be coffee. Very many of them are constant, if moderate, users of wine or other alcoholic beverages.

The first principle of their dietetics should be moderation, since these people habitually eat too much. A milk diet is excellent, but on account of the long course of the disease cannot be rigidly insisted upon. It is a good plan to make the milk foods an essential part of the diet. A mixed milk diet with cream, butter, vegetables, the farinaceous foods, fish, and the less irritant meats is satisfactory in most cases. The quantity of red meats should be greatly reduced and meat extracts, meat soups and game entirely forbidden, but it is necessary to regulate the diet according to the individual necessities, and this, in cases of debility, may require generous quantities of meat. Tea and coffee, if permitted at all, should be taken only in limited quantity. Alcohol in any form should, of course, be prohibited unless long habit makes it impossible to break off its use entirely.

An important point is to insist upon the use of a sufficient quantity of fluid, and water is the best beverage. This should be free from mineral matter and not less than two quarts should be taken daily.

Medicinal treatment is given to meet special indications. Laxatives should be given to regulate the bowels. Saline cathartics, such as the natural mineral waters (Hunyadi, Franz Josef, Apenta, etc.), are the most generally valuable. Indigestion is corrected by appropriate treatment. High vascular tension is best treated by the use of nitroglycerin ($^1/_{100}$ grain) or sodium nitrite (1 to 2 grains) three times a day; on the other hand, low tension with weak heart shows the necessity for digitalis.

To check the growth of the interstitial connective tissue potassium iodid or bichlorid of mercury have been given with good results. The former also reduces the arterial tension. Bartholow recommends the chlorid of gold and sodium ($^1/_{15}$ to $^1/_{20}$ grain) three times a day. Arsenic sometimes is useful, and iron is indicated when there is anemia. Basham's mixture is a good preparation (see Acute Parenchymatous Nephritis). Bruce recommends the following:

Iron tartrate .....gr. 8
Sol. potass. arsenit.....m. 3
Chloroform water .....dr. 4
Distilled water, enough to make.....oz. 1

Uremic complications should be treated as elsewhere recommended.

NEPHROLITHIASIS; RENAL CALCULUS.

DEFINITION.—A condition characterized by the deposit of concretions in the substance or pelvis of the kidney or the ureter.

ETIOLOGY.—Stone in the kidney occurs most frequently in children under fifteen and in adults over fifty. The disease is undoubtedly hereditary in many instances, especially when there is a family history of gout. The uric acid and lithemic diatheses are the prominent predisposing causes. It is believed by some authorities that a diet rich in proteids increases the susceptibility to the formation of calculi. Very acid urine certainly favors the precipitation of uric acid. The condition is much more common in some localities than others. This is generally attributed to an excessive saturation of the drinking water with lime salts.

In order to excite precipitation a foreign body of some kind must be present. This may be a shred of fibrin, a bit of mucus, tube casts, coagulated blood or bacteria. M. L. Harris (Jour. Am. Med. Association), as the result of a series of experiments, expresses the opinion that the presence of microorganisms is necessary for the precipitation of the urinary salts. He was able to secure different kinds of crystals by inoculating urine with different kinds of bacteria and keeping it at the body temperature in the brood-oven. This opinion seems to be supported by clinical evidence.

PATHOLOGY.—Renal concretions vary greatly in size; if very small they are called "sand," if a little larger "gravel," while stones of moderate or large size are called "calculi." They differ in physical properties according to the substances entering into their structure. There are three principal varieties: (1) *Uric acid* calculi are hard, their surfaces smooth but irregular in contour and dark red or brown in color. They are often

mixed with urates in well defined layers. In children the urates predominate. (2) *Calcium oxalate* stones are very hard, their surfaces very irregular and nodular, giving them a "mulberry-like" appearance. They are dark brown to black in color. (3) *Phosphatic* stones are composed of calcium or ammonio-magnesium phosphate. They are white or grayish-white and quite soft and pliable. In addition to the above there are rare forms, composed of cystin, xanthin, calcium carbonate and fatty, soapy or fibrinous substances.

Uric acid and oxalates are deposited from acid urine; the phosphates from alkaline urine. These substances are seldom found pure or unmixed in any calculus. The phosphates are generally deposited upon a nucleus consisting of a small stone of some other variety, its presence seeming to change the reaction of the surrounding fluid from acid to the alkaline necessary for the phosphatic form. The size and shape of the stone depends upon its location. As a rule they are small, seldom exceeding one-half inch in diameter, but sometimes they become very large, filling the pelvis of the kidney and sending projections or dendrites into the infundibula and calicyes, or downward into the ureter. These are termed dendritic or coral-like stones.

The changes of the kidney depend upon the location of the calculus and the amount of pressure which it exerts upon the renal and surrounding tissues. In the pelvis of the kidney it may excite a pyelitis or pyelo-nephritis, if escape of urine is prevented a hydronephrosis, or by direct pressure extensive atrophy of the parenchyma of the kidney may be the result.

Symptoms.—Aside from attacks of renal colic, a stone in the kidney may produce no symptoms, or the symptoms may be so slight as to cause the patient little annoyance. Frequently there is some aching pain in the lumbar region and tenderness upon deep pressure. The pain is increased by jarring the body. If the stone is large enough to cause extensive destruction or atrophy of the kidney or block the free escape of urine the patient's health will gradually fail, the pain in the back will become more severe, epithelium and pus will often be found in the urine, and hematuria and uremic symptoms are likely to develop and bring the scene to a close.

Renal Colic, produced by the passage of a stone along the ureter from the kidney to the bladder, is usually the first and often the only evidence of the disease. It generally commences suddenly; sometimes it is preceded by a chill. There is most agonizing pain which follows the course of the ureter, and radiates downward from the kidney to the testicle and inner surface of the thigh. The testicle is retracted. During the paroxysm the patient is unable to keep still; he rolls about upon the bed or floor; his skin is covered with a cold sweat; his pulse is rapid and feeble; the whole attitude is expressive of extreme anxiety and suffering. The condition borders upon collapse. The severity of the pain may cause convulsions or fainting. There is likely to be nausea and vomiting and local tenderness upon pressure. The urine is scanty, sometimes suppressed, and voided frequently and painfully drop by drop, on account of the attendant vesical spasm. It is often bloody. If it contains pus or epithelium, inflammation of the pelvis of the kidney is indicated. If it is clear, the organ is probably sound. There is generally a slight elevation of temperature.

An attack of renal colic may last a few hours or several days and is paroxysmal in character, periods of comparative comfort alternating with severe pain. Relief follows the passage of the stone into the bladder and is usually complete but considerable tenderness and pain in the kidney, ureter and testicle remains. Very rarely stones may form and produce obstruction in both kidneys simultaneously.

In the interval, examination of the urine may throw some light upon the character of the stone. If the urine is acid it points to uric acid or oxalate. The latter may be found in neutral urine. Phosphates are associated with alkaline urine. A careful microscopic examination of the urinary sediment should be made.

Diagnosis.—The diagnosis is usually easily made by a study of the history of the case. The recurring attacks of the pain, the tenderness in the region of the kidney and the presence of urinary concretions are characteristic.

Renal colic may be distinguished from intestinal colic by the location and direction of the pain, the local tenderness, the retraction of the testicle and the frequent painful urination.

Appendiceal colic is sharply localized, tenderness is at or near McBurney's point and urinary symptoms are absent.

The following table gives the distinctions from *biliary colic*:

Renal Colic.	Biliary Colic.
Pain commences in region of the kidney and passes down course of ureter to testicle.	Pain always in right hypogastric region, radiating toward the right shoulder.
Increased frequency of urination and vesical tenesmus.	No increased frequency of urination.
No jaundice.	Attacks are followed by jaundice.
Stone found in the urine.	Stone found in the feces.

Prognosis.—An attack of renal colic seldom causes death though this has sometimes occurred, but the tendency is for it to recur from time to time. Large calculi impacted in the pelvis of the kidney may produce grave complications resulting in permanent injury to that organ. Nevertheless the disease may and often does persist for years and produce no other symptoms than the occasional attacks of colic.

Treatment.—The excruciating pain of renal colic requires the hypodermic administration of morphin ($\frac{1}{4}$ grain) and atropin ($\frac{1}{150}$ grain), repeated in an hour if relief is not obtained, and again if necessary. Very large doses are frequently required to give relief. Hot fomentations or hot poultices may be applied to the lumbar region, or the patient may be put in a hot bath. This causes general muscular relaxation, relieving the pain and facilitating the passage of the stone. Hot lemonade or other hot drinks should be partaken of freely. The tendency to collapse should be met by hot brandy and water. Extreme paroxysms sometimes require the inhalation of chloroform.

During the intervals between attacks, special attention should be given to the patient's habits and diet. The condition to be met is often that of the gouty diathesis requiring a proper adjustment of nutrition to excretion by increasing the amount of exercise or physical work, reducing the proteid or uric acid producing food and requiring that a larger amount of bland

liquid (especially water) be drunk in order to wash out the waste. The quantity of lean meats and other nitrogenous foods, rich and highly seasoned foods, tea, coffee and alcohol should be reduced to a minimum. Over-indulgence of any kind should be forbidden. Water and milk should be the favorite beverages. The alkaline mineral waters as represented by Vichy or Carlsbad are especially to be recommended, or in lieu of these the milder waters of our own country, as Waukesha, Londonderry or Buffalo lithia. These probably owe their efficiency more to their purity than to the quantity of mineral constituents which they contain.

There is probably no remedy which will cause the solution of a calculus within the human body. There are some, however, which will check further stone formation. If we are dealing with uric acid calculi the drugs of most value are those which reduce the acidity of the urine, such as potassium citrate, acetate or tartrate. The citrate is the favorite and is given well diluted in doses of 20 to 30 grains three or four times daily. Since the urine is most acid the longest after fasting, Tyson recommends that 60 grains of potassium citrate be given at bedtime. Solution of potash is another useful remedy for alkalinizing the urine. Fifteen or 20 drops may be taken in milk. Lithium citrate and carbonate are reputed to be good solvents of uric acid and probably no remedies are used more for this purpose. The effervescing tablets are the best form of administration, 5 to 10 grains being taken three times a day. If there is pain and irritation in the kidneys the alkalies may be combined with uva ursa, corn silk or buchu, as in the following:

Potassium citrate .....dr. 4
Potassium carbonate .....dr. 3
Fluid ext. uva ursa.....oz. 1½
Simple elixir, enough to make.....oz. 6
Tablespoonful three times a day.

Piperazin is a good solvent of uric acid, but is expensive. The dose is 15 grains dissolved in plenty of water. Lycetol is another remedy of this class. Harris has shown that urotropin by checking the growth of bacteria prevents the deposit of the urinary salts. Seven and one-half grains two or three times

daily, taken in tablets and followed by plenty of water, is the usual dose.

One thing should be remembered in giving alkalies; if they are pushed too hard and the urine is strongly alkalinized the conditions are presented for the deposit of phosphates upon the uric acid or oxalate stones which already exist.

We have no remedy which will dissolve calcium oxalate stones but the condition should be treated upon the same lines as those just laid down for the uric acid calculi.

When we have the phosphatic stones almost an opposite condition exists; the urine is alkaline and we wish to acidulate it. In these cases the diet should contain a larger percentage of nitrogenous foods. The red meats are permissible and often of special nutritive value. Plenty of water should be drunk but it should not be alkaline. Boric and benzoic acid are given to acidulate the urine in 5 to 10 grain doses three or four times daily. They are not so pronounced in their effects upon the reaction of the urine as the potassium salts given with the opposite end in view. The mineral acids, as hydrochloric acid, may also be given internally. They diminish somewhat the tendency to alkalinity and are excellent stomachics.

NERVOUS PROSTRATION—See Neurasthenia.

NEURALGIA.

DEFINITION.—A functional nervous disease characterized by severe paroxysmal pain, corresponding to the distribution of the affected nerve or nerves.

VARIETIES.—Neuralgia is classified into varieties according to the nerves affected. We have trifacial neuralgia, cervico-occipital and cervico-brachial neuralgia, intercostal neuralgia, phrenic neuralgia, lumbar neuralgia, abdominal neuralgia, coccygodynia, sciatica, etc. In fact, almost any of the sensory nerves may be affected.

ETIOLOGY.—Neuralgia usually occurs during middle life; it is rarely seen either in childhood or old age. It is somewhat more common in women than in men. There is a distinct hereditary tendency in at least 25 per cent—probably more. Neurotic individuals are the ones most likely to be affected.

Predisposing causes are anemia, debility, improper hygiene and sanitation, overwork, exhaustion and sexual and other excesses. In many cases there is a distinct toxic cause, as found in malaria, rheumatism, gout, syphilis and poisoning with alcohol, tobacco, tea, coffee, lead, arsenic and mercury. Haig places great emphasis upon uricemia as a cause of neuralgia. Auto-intoxication from absorption of intestinal toxins is undoubtedly a frequent cause. The condition is much more common during winter and early spring. Attacks are excited by exposure to cold and wet. Among reflex causes are eye-strain, decayed teeth and uterine and ovarian disease. Central nervous disease and the pressure of tumors or the contraction of cicatrices may cause neuralgic pain.

There is no morbid change in the nerve in neuralgia as there is in neuritis. Before a line of distinction was carefully drawn, many of the cases of the latter disease passed under the name of neuralgia. Undoubtedly many cases now believed to be functional will eventually be shown to be really organic.

The pathogenesis of the disease is obscure. It may be due to nervous innutrition from a depraved condition of the blood or to limitation of the blood supply by an endarteritis, or according to Haig, temporary contraction of the capillaries. Collins expresses the opinion that in many cases it is due to the direct action of toxic substances upon the sensory nerves.

Symptoms.—The principal and all-important symptom of neuralgia is *pain*. This usually comes on suddenly but in some cases the patient can predict an attack by a preliminary feeling of muscular soreness. The pain varies somewhat in character, according to the nerve affected and the temperament of the patient, but it is usually very severe, paroxysmal in character, shooting, stabbing or boring, and following the course of the nerve to its distribution. While the pain may be fairly continuous, there are often sudden exacerbations lasting a moment or perhaps several minutes. The pain may be associated with the local sensation of heat or burning.

There are found along the course of the nerve certain points which are tender to pressure known as *Valleix's points*. These correspond to the emergence of the nerve from a bony canal or its impingement upon some hard substance which offers

resistance to the examining finger. A paroxysm may last a few moments only or be prolonged for hours, or in rare cases for days.

There are often pronounced vaso-motor disturbances, such as herpetic and other skin eruptions, local alterations of temperature, local sweating, blanching or pigmentation of the skin and whitening or falling of the hair. Muscular twitching is common in cases of some standing.

Many cases of neuralgia show a marked periodic tendency—i. e., the attacks recur upon certain hours or days. While these are not necessarily due to malaria, it is true that in most cases this is the cause, and they are relieved by quinia.

Special Forms of Neuralgia.—*Trifacial neuralgia* (tic-douloureaux) is an affection of one or more of the three branches of the fifth nerve. If the *ophthalmic* branch is affected the pain is referred to the region above the orbit, to the lid, often to the eye itself, which may be red and watery, and to half the nose; the tender point is at the supra-orbital notch. This form is often malarial and is popularly called "brow-ague." If the *infraorbital* branch is affected the painful area is the cheek, below the eye and above the mouth; the tender point is the infraorbital foramen. If it attacks the third or *inferior maxillary* division, pain is felt in the temple, ear, lower jaw and tongue. The tender point is at the exit of the nerve from the mental foramen. Tic-douloureaux is at times a most excruciatingly painful disease and may be so constant or the attacks may recur at such short intervals as to impel the patient to suicide. Muscular spasm and whitening of the hair are common.

Cervico-occipital neuralgia follows the distribution of the upper cervical nerves and affects the neck and posterior portion of the head. The principal tender point is found between the mastoid process and upper cervical vertebra.

Cervico-brachial neuralgia follows the distribution of the lower cervical nerves (the brachial plexus). Pain is felt in the shoulder and arm, along the ulnar and radial nerves. There are tender points in the axilla and at various localities along the main nerve trunks.

Intercostal neuralgia occurs most frequently on the left side

of the chest and the pain is often referred by the laity to the heart. The middle intercostal nerves are the ones generally affected. The tender points are near the spinal column where the nerve emerges, in the axillary line, and anteriorly near the sternum. Pain is increased by respiration or movement of the chest. This is sometimes called *pleurodynia.*

Sciatica is a very common form of neuralgia. It is described under the title Sciatica (which see).

DIAGNOSIS.—It is often difficult to differentiate between neuralgia and *neuritis.* The latter disease is more strictly localized, the pain does not change from one locality to another as is frequently the case in neuralgia, it is more constant, there is generally more or less interference with muscular function and disturbances of nutrition are more marked.

In *muscular rheumatism* the pain is continuous, is localized in a muscle or group of muscles and is greatly increased by movement.

The *crises of locomotor ataxia* are readily recognized by an examination of the reflexes.

PROGNOSIS.—Dependent upon locality and cause, but usually favorable, though often very persistent and difficult to cure. Severe cases of trifacial neuralgia often grow progressively worse in spite of medicinal treatment.

TREATMENT.—Curing a case of neuralgia depends upon accuracy of diagnosis—in other words, upon the location of the cause. This may be local or general. In the first case the pain may be due to the pressure of a tumor, fibrous deposits in the nerve trunk or ganglia or the contraction of a cicatrix; or it may be caused by decayed teeth, nasal or pharyngeal disease, or ovarian or uterine irritation. These conditions all require local treatment, often surgical. Cimicifuga was at one time a favorite drug for the neuralgias due to ovarian disease. The following formula given by Shoemaker certainly does good in some cases:

Fl. ext. cimicifuga	oz. 1½
Tinct. nux vomica	dr. 1
Tinct. cinchona	oz. 5

Teaspoonful in water every three or four hours.

Aletris, viburnum, etc., are often decidedly beneficial in pelvic

disease. The proprietary "cordials" and "compounds" are certainly meritorious preparations.

Malarial neuralgia is usually distinctly periodic; often the supra-orbital branch of the fifth nerve is affected ("brow-ague"). These cases demand quinin in large doses (20 to 30 grains). This is not only curative but directly relieves the pain of an attack. Ergot has also been recommended in these cases. If the pain is very severe morphin, or better codein, may be given with the quinin, the bowels being kept open by an occasional mercurial. Arsenic is of great value. Fowler's solution or the solution of sodium arsenate may be given, commencing with three to five drops of either and increasing a drop a day until the physiological effects are produced.

Neuralgia of rheumatic origin is benefited by a course of the salicylates and by the alkalies. The salicylates are also analgesic. Sodium salicylate is given in 10 to 20 grain doses every three hours. Salipyrin or salophen are good preparations in these cases.

Gouty patients should be put upon a carefully regulated diet from which excess of proteids and tea, coffee, alcohol and tobacco are excluded. Potassium citrate, bicarbonate and acetate and the lithium salts are indicated; they should be taken largely diluted in pure water. Piperazin is another valuable remedy, about 15 grains being taken daily in solution.

Syphilitics, of course, require specific treatment with mercury and the iodids.

When it is probable that absorption of ptomains from the bowels is responsible for the neuralgia, eliminants and intestinal antiseptics should be tried. They will prove curative in many cases. Small doses of calomel, the purgative waters and salol, the sulphocarbolates of zinc and sodium, resorcin and beta- and benzo-naphthol are suggested remedies.

Remarkable improvement sometimes follows the daily use of large doses of castor oil. One to two ounces of this drug are given every morning, the larger dose in case the patient is habituated to the use of opiates. It does not cause excessive purging. Aldrich (Clev. Med. Jour.) has found that a combination of this method with Dana's strychnin treatment gives the best results.

Many, probably most, patients who are subject to neuralgia

are debilitated and anemic. These require rest, relaxation and change to a warm, dry climate when possible. The diet should be generous but simple, and careful attention should be given to alimentation. Nutrients and tonics are indicated, such as cod-liver oil, malt preparations, the compound syrup hypophosphites, the bitter tonics—gentian, cinchona, calumba, etc.—strychnin, arsenic, quinin, phosphorus and iron. The last group of drugs is particularly valuable. Blaud's pill is a favorite prescription. Below are given other formulas:

Reduced iron .....gr. 100
Arsenious acid .....gr. 4
Phosphorus .....gr. 1
Ext. nux vomica.....gr. 25

Make 100 pills. One after each meal.

Iron carbonate .....dr. 2
Quinin sulphate .....gr. 6
Ext. opium .....gr. ¾
Simple syrup, a sufficient quantity.

Make 16 pills. Eight pills during the day.—Jopley.

Elliott and Dana have claimed excellent results from the hypodermic use of strychnin nitrate in trifacial neuralgia. They commence with $^1/_{60}$ to $^1/_{40}$ grain, which is increased daily until in a week the patient receives ½ to ¾ grain at each injection. Collins combines a small amount of morphin with this drug. If there is evidence of arterial degeneration or chronic exudative inflammation in the neighborhood of the nerve the iodids are indicated. Nitroglycerin may also be useful.

Many remedies have been suggested for the relief of pain. Before resorting to the internal use of powerful analgesics it is better in cases of moderate severity to exhaust the local applications. The best of these is heat applied in some way. A hot brick wrapped in flannel, a flatiron, a stove lid or a hot-water bottle are nearly all to be had in any home. A bag of sand can be heated in any oven and retains its temperature a long time. A convenient little article which may be carried about is the pocket Japanese stove.

But in spite of these remedies the pain may still continue. Various drugs may then be tried locally. The oleate of aconitin (2 per cent solution) may be painted on or the aconitin ointment (B. P.) may be rubbed in. One of the simplest is the

linimentum aconiti et chloroformi (N. F.), which has the following formula:

Tinct. aconite	dr. 2
Chloroform	dr. 2
Soap liniment	oz. 3

Da Costa recommends the following:

Aconitin	gr. 4
Veratrin	gr. 15
Glycerin	dr. 2
Cerate	dr. 6

To be rubbed over the parts. Do not apply to an abraded surface.

A prescription which Collins finds may be used advantageously is:

Camphor	dr. 1
Chloral	dr. 1
Menthol	gr. 20

Rub on a few drops at a time.

Others are:

Menthol	gr. 22½
Cocain muriate	gr. 7½
Chloral hydrate	gr. 4½
Vaselin	dr. 2½

Apply to the painful part and cover with court-plaster.

Ichthyol	gr. 15
Mercurial ointment	gr. 15
Chloroform	dr. 1½
Spirit of camphor	dr. 1½

Apply topically.—Eulenburg.

The benefit derived from liniments is due not only to the evaporation of the remedy but also to the massage; this is of decided value sometimes, especially when the neuralgia has developed upon a diathetic condition. Probably the rubbing stimulates the nutritive blood supply. In trifacial neuralgia relief is sometimes obtained by freezing the surface with methyl chlorid or some similar preparation.

Reference to the value of electricity must be made. The galvanic current is usually employed, the positive pole being placed over the painful area. Some authors consider this the most useful local expedient.

The internal administration of drugs is demanded in most cases. Morphin will give speedy relief, but should be a last

resort, since many of these patients are neurasthenics and easily become victims to the habit. In some cases, however, its use is imperative. The hypodermic method of administration is most satisfactory. Before giving it codein should be tried; given in a prescription patients are not so likely to know that they are taking a narcotic; in suggestible patients this is important.

The coal-tar drugs are free from the danger of habit and are comparatively safe. The following are suggested formulas:

Acetanilid ..... dr. ½
Ammonium chlorid ..... gr. 12
Caffein citrate ..... gr. 6
Sodium bicarbonate ..... gr. 12

Make 12 capsules. One or two capsules, repeated every two hours while necessary.

Acetanilid ..... gr. 24
Codein sulph ..... gr. 3
Caffein citrate ..... gr. 6
Sodium bicarb ..... gr. 12
Milk sugar ..... gr. 12

Make 12 capsules. One capsule every two or three hours.

Antipyrin ..... dr. 1½
Tinct. gelsemium ..... dr. 1
Elixir valerian, ammon., to make ..... oz. 2

Teaspoonful in water every two or three hours.

Trifacial neuralgia is often benefited by the use of aconite or gelsemium. These must be given in considerable doses and continued until their physiological effects are produced. Aconitin, in $^1/_{200}$ grain pills, is a convenient method of administration. The fluid extract of gelsemium should be given in 5-drop doses every three hours. Collins says the following mixture is good:

Tinct. aconite ..... dr. ½
Tinct. gelsemium ..... dr. 4

Ten drops every half-hour until tingling is felt in the fingers.

Shoemaker gives the following formula:

Ext. aconite ..... gr. 4
Quinin bisulphate ..... dr. 1
Piperin ..... gr. 5

Make 20 pills. One every two hours until relieved, then every four hours as long as necessary.

Very popular pills are those of Gross and Brown-Sequard The former has the following formula:

Quinin sulphate	gr. 2
Morphin sulphate	gr. 1/20
Arsenous acid	gr. 1/20
Ext. aconit	gr. ½
Strychnin	gr. 1/30

Dose 1 to 2, three or four times a day.

Brown-Sequard's pill contains:

Ext. hyoscyamus	gr. 2/3
Ext. ignatia	gr. ½
Ext. opium	gr. ½
Ext. belladonna	gr. 1/6
Ext. conium	gr. 2/3
Ext. stramonium	gr. 1/5
Ext. aconite	gr. 1/3
Ext. Cannabis Ind	gr. ¼

The Gross pill has the special advantage of containing tonic and reconstructive drugs. It may be made without morphin if desired.

A formula which is especially valuable in neuralgic pain due to rheumatism, gout or lithemia is the following:

Antipyrin	dr. 2
Sodium salicylate	oz. ½
Arom. spts. ammonia	oz. 1
Simple elixir, enough to make	oz. 6

Dessertspoonful every two to four hours.

NEURASTHENIA; NERVOUS PROSTRATION.

DEFINITION.—A condition of nervous irritability or weakness caused by exhaustion of the nerve centers and marked by disturbances of sensation, unusual fatigue following mental or physical labor, various disturbances of sensation and a variety of psychical symptoms.

ETIOLOGY.—Neurasthenia is a disease of middle adult life, infrequent in children or old age. It occurs with about equal frequency in both sexes. It has been called an "American disease," but other races are even more susceptible, notably Hebrews. There is a marked neurotic heredity in the majority of cases. Predisposing causes are rheumatism, gout, syphilis, tuberculosis or other conditions which produce systemic debility.

Exciting causes are masturbation, sexual excesses, mental strain, loss of sleep and the high-tension living incident to modern social life, worry, anxiety, excitement, acute illness, frequent pregnancies, dysmenorrhea, the menopause, sudden or severe shock, physical injuries and drug habits.

SYMPTOMS.—The symptoms of neurasthenia are all referable to lack of nervous force; the physical or intellectual power is still good, but a small amount of labor is sufficient to produce temporary exhaustion. The most prominent symptom is great *fatigue* following slight exertion; this is practically constant and is associated with a variety of other symptoms. In most cases there is emaciation and debility, but many patients are well nourished and apparently in excellent health.

Motor Symptoms.—There is more or less loss of muscular power, more marked after a group of muscles become tired. This is shown by the rapid exhaustion following walking. It is practically tested by the dynamometer. There are frequently tremors; muscular twitching is often seen. The tendon reflexes are usually increased. There is no paralysis or wasting unless this condition follows disuse.

Sensory Symptoms.—Headache is very common and often follows mental or physical overwork or unusual excitement. It may be diffuse, or occipital, frontal or vertical; very frequently pain is felt in the occiput and nape of the neck; this may be associated with a drawing sensation. The patient often complains of a weight or heaviness, or of a band around the head. During the headache there is often a hypersensitive condition or "tenderness" of the scalp. Backache is another common symptom. There may be pain between the shoulder blades, or in the small of the back. There is usually tenderness along the spine, most marked at certain carefully localized points.

Vertigo is also present in many cases. Other disturbances are "flashes of heat and cold," prickling, tingling, crawling and numbness of the skin. These sensations may be localized, felt in the testicles, nipples, scalp or other portions of the body. Eye symptoms are often prominent. The simplest are tiring of the eyes and weakness of vision, so that the patient can read only a little while before the letters become blurred. Sometimes there is photophobia. Hearing and smell may become

more acute or less so. Often there is extreme sensitiveness to slight noises.

Visceral Symptoms.—Cardiac palpitation or irregularity is often present; the pulse is usually rapid and may be very much accelerated. The sense of oppression and precordial pain often lead the patient to believe he has heart disease, from which opinion it is hard to disabuse him. Digestive disturbances are protean in their variety and of the types known as nervous dyspepsia. The appetite is fitful. Constipation is the rule, but there may be occasional attacks of diarrhea. The urine is often scanty and high colored; in some cases it is pale and copious. Some of the most troublesome symptoms are referred to the sexual organs (sexual neurasthenia). These include spermatorrhea, loss of virility, impotence and a sense of exhaustion after coition.

Mental Symptoms.—Neurasthenic patients show inability to perform much mental work. They are exhausted by efforts to concentrate the mind and forgetful of details, making them anxious over their "loss of memory"; this is apparent rather than real. They are depressed, peevish and irritable, hypersensitive over imaginary ills, exacting in attentions from those around them and introspective. They are likely to lose their courage and self-reliance, are filled with vague fears and "imaginings," and excited by unusual sights and sounds. The mental condition often borders upon melancholia and is very distressing to themselves and friends. They often suffer from *insomnia*, especially during the first part of the night. The sleep is troubled by unpleasant dreams and is unrefreshing, so that the patient awakes in the morning exhausted.

Diagnosis.—The principal condition with which neurasthenia is likely to be confounded is hysteria. These diseases may, however, coexist. Eskridge says: "We must remember that neurasthenics may become hysterical, but that hysterics while they may be neurasthenic, never become neurasthenics pure and simple."

Hysteria is much more rapid, often abrupt in its onset, is associated with certain "stigmata," such as globus hystericus, hysterical pain in the head (clavus), and hysterogenetic zones. Spasmodic seizures are common in hysteria and are absent in

neurasthenia. Neurasthenics are very subject to neuralgia; hysterics seldom. Hysterical persons are not markedly troubled with insomnia and the whole range of hysterical symptoms is much more variable.

PROGNOSIS.—The prognosis is good if the patient can be treated before actual structural changes have taken place, provided there is no severe complicating disorder or unusual debility. Cases beginning late in life are most resistant. There is a marked tendency to recurrence.

TREATMENT.—No disease tries the tact and discretion of the physician more than neurasthenia. He must understand his patient, and inspire him with respect and confidence. This is more than half the battle. It is, of course, essential to learn the cause, and if this is possible bring to an end the factors which are responsible for the condition. Any underlying diseases should receive proper treatment, vicious habits should be stopped and the patient relieved from any mental strain to which he has been accustomed. *Rest* is the most important measure in treatment. This is most effective if associated with change of scene and environment. A long vacation, with leisurely travel, a sea voyage, a carriage trip through the country or "camping out" in the woods are all excellent means of changing the current of the patient's thought and relieving him of the overwork, which would seem to him necessary at home. If such an outing is impossible, the hours of work should be shortened, he should be instructed to sleep late in the morning and retire early to bed at night and to avoid all excitement or mental activity. In some severe cases, especially women, it is important to send the patient away from too solicitous friends, whose constant anxiety serves as a continuous suggestion and helps to perpetuate the disease. Such patients if debilitated and poorly nourished, as is usually the case, are much benefited by the Weir-Mitchell rest cure in some good sanitarium. This consists of isolation in the care of a capable nurse, perfect rest in bed, forced feeding and artificial exercise, including massage and electricity

Diet should be carefully regulated, unless the patient is well nourished, when too much attention to digestive symptoms is likely to increase rather than decrease the trouble. It should

be regulated according to the variety of gastric neurosis which is present. Patients upon the rest cure are placed first upon milk, given every two or three hours in increasing quantities. Eggs, rice and other easily digested foods are added, then lean meats, cereals, etc., the patient being given all the food he can digest. Stimulants of any kind, including tea and coffee, should not be used by neurasthenics.

Hydrotherapy is of great practical importance as an adjuvant to the preceding methods of treatment. Cold water is most useful but must be used with some care on sensitive persons; if there is failure to react promptly the method must be modified. The cold shower or sponge bath with friction, the needle spray or douche, or the cold "drip" sheet may be used. The temperature may be at first relatively high and gradually reduced as tolerance is obtained. By standing in warm water the tendency to shock is considerably reduced. For insomnia the full hot bath before retiring is often efficacious, or the Neptune girdle, consisting of a cold compress applied to the abdomen.

Massage and electricity also have an important place in the treatment of neurasthenia, principally to replace actual exercise. In the rest cure massage is used daily. Static electricity is usually preferred and has a decided tonic and invigorating effect, which is heightened by the mental impression made by the static machine. Faradic electricity stimulates muscles which are temporarily unused.

Suggestive therapeutics has its greatest field of usefulness in these cases. Physicians should have a greater appreciation of its value and its possibilities and not delegate to Christian Scientists and magnetic healers this useful agent for good. Hypnotism is seldom necessary. Often the reiterated suggestion to the patient that his condition is curable and that the physical methods used will without question effect a cure, will have a decided influence for good that no drug or drugs alone will have. Faith in the physician is of first importance.

Drugs are of minor importance and should be avoided as far as possible, especially analgesics and hypnotics that may engender a drug habit. Insomnia should be treated upon hygienic lines by hydrotherapy and other natural methods (see Insomnia). Anemia and debility are benefited by iron, arsenic, strych-

nin, etc. Strychnin is the drug of most value. Other remedies may be given to meet special indications.

NEURITIS.

DEFINITION.—Inflammation of the nerves.

VARIETIES.—There are two principal varieties—(1) Simple or focal neuritis, in which a single nerve is affected; (2) multiple neuritis, in which a number of nerves are affected. It may also be classified according to cause, as traumatic, "rheumatic," epidemic, alcoholic, arsenical, etc.

ETIOLOGY.—Neuritis may be caused by exposure to cold ("rheumatic" neuritis), traumatism, extension of adjacent inflammation or infectious diseases such as malaria, typhoid fever, diphtheria, smallpox, syphilis, tuberculosis, etc. Multiple neuritis is very frequently caused by toxic drugs, the most important being alcohol, arsenic, lead, mercury and carbon bisulfid. A common form of neuritis is herpes zoster. A form which frequently occurs in the tropics is known as beri-beri.

PATHOLOGY.—The disease usually commences as a perineuritis or inflammation of the nerve sheath. The nerve trunk is red, swollen and infiltrated with leukocytes. In mild cases the sheath and connective tissue framework are most affected, but in more severe cases the nerve fibrils also partake of the inflammatory process, or on account of pressure undergo degenerative changes and atrophy. This may be very extensive, the nerve fibers being at times entirely replaced by connective tissue. In the parenchymatous form the nerve fibers are affected primarily and there may be no external signs of inflammation. The axis-cylinder degenerates and its continuity is broken. Muscles supplied by this nerve ultimately atrophy if the disease is not checked. The inflammation or degenerative process proceeds toward the periphery; central extension is usually checked at Ranvier's nodes.

SYMPTOMS.—In the *focal form* of neuritis there are sharp, shooting *pains,* often increased by motion and felt in the area of distribution of the nerve; there is tenderness along its course. There may be redness and swelling of the superimposed skin; other symptoms are sensations of heat, tingling, numbness, etc. Often tactile sensibility is absent. Motor symptoms are impair-

ment of muscular strength, tremors and twitchings and lessened reflexes. In long continued cases there may be actual paralysis with atrophy of the group of muscles supplied by the nerve. Sometimes there are contractures of fingers or toes or other muscle groups. The electrical reaction of degeneration is found in advanced cases. Trophic symptoms are often marked, such as herpetic eruptions (as in herpes zoster), a glossy appearance of the skin, whitening and falling of the hair and brittleness of the nails, local sweating and in some instances effusion into a joint.

Multiple neuritis may be rapid or slow in its onset. When due to acute infections it usually commences abruptly with chill, high fever (103° to 104° F.), severe headache, backache, muscular pains and malaise. The tongue is coated, there is loss of appetite, gastric disturbance and constipation. The nervous symptoms characteristic of the disease make their appearance in a day or two. Cases due to chronic intoxications and drug poisoning appear more gradually, constitutional symptoms not being marked; there may be some initial fever or it may be entirely absent. Gastric catarrh, insomnia and hyperesthesia are early symptoms. Multiple neuritis attacks a number of nerves at the same time. Loss of muscular power is noticed early in the course of the disease and this increases as the disease progresses until there is well-marked paralysis. This usually commences in the lower extremities and extends upward to the upper extremities, sometimes affecting speech, respiration and heart action. The extensor muscles are affected more than the flexors; this causes "foot-drop" and "wrist-drop." The latter symptom is especially marked in lead-poisoning. There may be loss of function of the sphincters in severe cases. As a result of the paralysis there is more or less wasting of the muscles and abolition of deep reflexes, like the knee-jerk. Electrical reaction to the faradic current is often lost while that to the galvanic is greatly diminished. Tenderness on pressure over the course of the nerves is marked.

Trophic symptoms include the glossy skin, local sweatings, the formation of bed-sores and local or general edema. Pain is usually present along the course of the nerve and is darting and stabbing. It is not, however, constant; in some cases

it is hardly noticeable and is overshadowed by the motor symptoms. Hyperesthesia over the affected area is the rule early in the disease, but later is often replaced by *anesthesia.* Mental symptoms are marked in alcoholic neuritis; in other forms they are usually slight or absent. They include loss of memory, hallucinations and insane delusions.

Pseudo-tabes is a form of the disease closely simulating locomotor ataxia. There is incoordination and abolition of the knee-jerk. Cutaneous sensibility is, however, good, and the characteristic neuritic symptoms are present. "Foot-drop" causes a peculiar gait.

DIAGNOSIS.—Focal neuritis may be mistaken for *neuralgia,* but in the latter disease there is no tenderness over the course of the nerve; no paralysis, atrophy or loss of function; and the pain is less constant and inclined to change rapidly from one region to another.

In *locomotor ataxia* there is no tenderness over the course of the nerve; sensory disturbances are less marked; there is no paralysis or atrophy. The gait of locomotor ataxia is due to lack of incorordination; the foot is brought down flat. The gait of pseudo-tabes is due to the necessity of lifting the foot high in order to raise the toes of the paralyzed member from the ground. In locomotor ataxia there are the Argyll-Robertson pupil, Romberg's sign, etc.

PROGNOSIS.—In focal neuritis complete recovery is the rule, though contractures or paralysis may persist in lingering cases. The duration varies from a few days to several weeks. The acute infectious forms of multiple neuritis are sometimes dangerous to life, but the prognosis is generally good.

TREATMENT.—Remove the cause if possible. Alcohol should be withdrawn, gradually if necessary; careful search should be made for possible metallic or vegetable poisons in the food, water, cosmetics or surroundings (as in certain trades or occupations). Malaria, if present, requires the administration of quinin; rheumatic cases are benefited by the salicylates and alkalies; syphilis by mercurials and the iodids.

Perfect *rest* is the first essential of treatment. In severe cases the patient should not be allowed to move, even to feed himself. If a limb is affected it should be put in a splint.

Medicinal treatment should be commenced with a thorough evacuation of the intestinal tract with a mercurial followed by a saline. Local applications should be made to the affected region. Heat is usually the most agreeable, but cold may be applied if preferred. Wrapping the part in cotton-wool sometimes adds to the comfort of the part. The Japanese stove, the hot sand-bag and the hot-water bottle are convenient methods of applying heat. Or counter-irritants may be used, as the aconite and chloroform liniment (N. F.) or

Menthol	gr. 20
Camphor	dr. 1
Chloral	dr. 1

Morphin by hypodermic administration is most effective for the relief of pain, but must be used with great caution on account of the danger of acquiring the habit. Codein and the coal-tar drugs are more satisfactory in cases of moderate severity. The formulas recommended for Neuralgia may be tried, or

Codein sulphate	gr. 5
Caffein citrate	gr. 5
Sodium bicarbonate	gr. 40
Acetanilid	dr. 1

Make 20 capsules. One or two capsules every three hours.

Salicylate of sodium often gives decided relief to the pain. When the acuteness of the symptoms has subsided the galvanic current, used moderately, is decidedly beneficial. Strychnin hypodermically, commencing with small doses ($^1/_{100}$ to $^1/_{60}$ grain) and gradually increasing the quantity, is also useful at this stage. These measures hasten the restoration of paralyzed and atrophied muscles. Potassium iodid may also be prescribed in suitable cases. Tonics and nutrients should be used if required and such extra-medical measures as massage and hydrotherapy will give excellent results in many lingering cases.

NOSEBLEED—*See* Epistaxis.

ORCHITIS AND EPIDIDYMITIS.

DEFINITION.—Inflammation of the testicle. When the body of the gland proper is affected the disease is called orchitis; if the epididymis is inflamed, it is known as epididymitis.

ETIOLOGY.—The most common cause of testicular inflamma-

tions is gonorrhea. Epididymitis, or epididymo-orchitis, is rather a frequent complication of this disease, occurring, according to Hyde and Montgomery, in from 6 to 15 per cent of all cases. It usually appears in the stage of decline as a result of faulty hygiene, careless sexual living, or overexertion. It may also be caused by the use of strong injections, the introduction of catheters or sounds, the lodgment of vesical calculi in the urethra or traumatism. Orchitis frequently complicates mumps. Rarely it may be induced by exposure to cold or by other infectious diseases, such as variola, scariatina, malaria, influenza and typhoid fever. The infection probably obtains access to the epididymis from the posterior urethra, through the ejaculatory ducts and vas deferens.

Symptoms.—The onset of acute inflammation of the testicle may be preceded by chilliness, slight fever, malaise, and discomfort or dull pain in the groin. Often the disease comes on suddenly usually in the left testicle, with sudden severe pain which increases in intensity until it becomes, at times, almost unbearable. The organ meanwhile becomes swollen, greatly enlarged, red and tense and extremely tender; the slightest pressure causes nausea and faintness. If the epididymis is chiefly affected it may be felt as an irregularly shaped tumor above and back of the testicle; there is usually edema into the tunica vaginalis, which increases the size of the organ and obscures the outline of the epididymis. The scrotal tissues are also infiltrated. Orchitis is less common than epididymitis and occurs chiefly as a complication of mumps; the tumor is smaller, smoother, harder and more painful and tender.

Chronic inflammation of the testicle follows an acute attack or comes on gradually. Chronic orchitis may be due to syphilis, or rarely, to gout and malaria. Chronic epididymitis is usually the result of an acute inflammation but it may be tubercular. There may be relapsing attacks in the course of a chronic posterior urethritis. The symptoms are much less severe than in the acute form, consisting of some swelling and pain. Prolonged testicular disease frequently results in atrophy.

Prognosis.—Good as to life, but epididymitis, by causing obliteration of the glandular outlet, is a frequent cause of ster-

ility in the male. Atrophy of the testicle sometimes follows acute and chronic inflammations.

TREATMENT.—Rest in bed is important in all cases of swelled testicle; it is essential in severe cases. The gland should be elevated and supported. It may be allowed to rest upon a pillow, or better still upon a platform made by stretching a wide strip of adhesive plaster across the thighs with the upper edge near the perineum, the scrotum being lifted up while it is being adjusted. This may be padded with a number of layers of gauze or cotton-wool. Another convenient support is made by placing the middle of the base of a long triangular bandage beneath the scrotum and tying the lateral ends to a belt passed around the body; the third corner or apical end of the bandage is drawn directly up and tied to the belt in front, thereby elevating the scrotum. To help keep it in place, tapes may be sewed to the upper edge of the bandage on either side of the scrotum, passing behind the thighs, then upward and outward to the belt, where they are also fastened.

Local applications contribute greatly to the patient's comfort and help to subdue the inflammation. At the beginning of the attack cold compresses or the ice-bag may be useful. In most cases, however, heat in the form of compresses is most agreeable. Gauze folded into a pad of moderate thickness and wrung out of water as hot as the patient can comfortably bear is applied to the swollen testicle and covered with oiled-silk, thin rubber-sheeting or dentist's rubber-dam. It should be changed frequently enough to keep the temperature uniformly warm. A linseed poultice may be used in lieu of this, and if the pain is very severe laudanum may be added to it. The tobacco poultice is an effective anodyne; it is made by stirring one-half to one ounce of fine-cut tobacco in an ounce of water. Buechel (Louisville Monthly Jour. of Med. and Surg.) uses a modification of the tobacco poultice which is made by mixing with tobacco or Scotch snuff sufficient glycerin or hot alcohol to give the mass the consistency of butter.

In less acute cases or when the more severe symptoms have subsided a dry dressing may be substituted. Merely wrapping the scrotum in cotton-wool is useful. In the later stage anodyne

and absorbifacient ointments and paints are useful. The following may be tried:

Tinct. aconite ..... dr. 2
Guaiacol ..... oz. 1
Glycerin ..... oz. 3

Apply compresses wet with this solution to the scrotum.—Buechel.

Powdered opium ..... oz. 1
Powdered starch ..... oz. 1
Glycerin, enough to make a paste.

Apply to testicle.—Taylor.

Mercury oleate ..... dr. 1½
Morphin sulphate ..... gr. 4
Oil wintergreen ..... dr. 1
Oil olive ..... oz. 4

Apply to testicles after bathing and wrap in absorbent cotton.—Shoemaker.

Ichthyol ..... dr. 2
Ext. belladonna ..... gr. 10
Lanolin ..... oz. 1

Apply to the testicle, spread on gauze.

Mercurial ointment ..... oz. ½
Belladonna ointment ..... oz. ½

Apply locally morning and evening.—Martin.

The subsidence of the inflammation is often very much hastened by touching the scrotum in ten or twelve places over the inflamed area with the Paquelin cautery at a white heat, after which the testicle is wrapped in absorbent cotton and carefully bandaged. If there is escape of fluid into the tunica vaginalis it may be evacuated by the aspirating needle or an ordinary hypodermic syringe.

Strapping the testicle is a useful measure in cases of epididymitis after the acute stage of the disease has passed. This is performed by bringing the testicle to the bottom of the scrotal sac and gently compressing the epididymis and other swollen tissues just above. This point is now carefully encircled by a narrow rubber or lead adhesive plaster, adjusted in such a way as not to cut the skin at the edge and not drawn tight enough to cause pain but sufficiently tight to prevent the testicle from slipping upward. The scrotum is now snugly covered with longitudinal and circular strips of plaster. If properly applied this should not cause pain aside from that incident to

the manipulation. The dressing must be reapplied in twenty-four to forty-eight hours. This serves to reduce the swelling and hastens the absorption of inflammatory exudate. A well-fitting suspensory should be worn.

Little internal medication is required. At the beginning of treatment the bowels should be evacuated with a mercurial. A morning dose of a saline cathartic or laxative mineral water will be expedient in some cases. A mild alkaline diuretic may also be administered if the urine is concentrated or irritant. Active treatment for gonorrhea should be suspended. Pain, if severe, may require the use of morphin hypodermically or an opium and belladonna suppository.

Tincture pulsatilla in drop doses every two or three hours sometimes has a good effect upon an acute inflammation of the testicle.

PARALYSIS AGITANS; PARKINSON'S DISEASE.

DEFINITION.—A chronic disease of the nervous system, characterized by tremor, a typical gait and facies, and increasing muscular weakness and rigidity.

ETIOLOGY AND PATHOLOGY.—Paralysis agitans usually occurs after middle age and is more frequent in men than in women. Heredity is supposed to have some influence and a neurotic constitution seems to predispose to its production. Exciting causes are exposure to cold and wet, anxiety, fright, mental strain, traumatisms and some diseases, such as rheumatism and malaria. The pathogenesis is obscure. The morbid changes found are similar to those of senility and are not distinctive. According to Gordinier the primary changes are to be found in the blood-vessels, resulting in patches of sclerosis of the anterior horns. C. L. Dana thinks there is disturbance of function and degeneration of the dendrites of the motor cells, "which interfere with the even flow of motor impulses, and finally lead to motor weakness and rigidity, owing to the cell being practically cut off from the brain."

SYMPTOMS.—The symptoms of the disease usually come on gradually, but in rare instances the onset is abrupt. Tremor is the first symptom and commences in the hands or feet, most frequently in the left hand, passing from there to the left foot,

then to the right hand and right foot. The head is last affected and the muscles of the face escape. The tremor is continuous except during sleep, when it ceases, except in advanced cases, in which it may cause insomnia. It is increased by excitement but is often diminished during physical work. The rate of the tremor is three to five per second.

The disease causes more or less weakness of the muscles, hesitancy of motion and ultimately rigidity or spasm. This is seen early in a characteristic form in the hand; the fingers are held close together at a right angle to the palm and move against the tremulous thumb. The movement of the index finger against the thumb has been compared to that used in rolling pills. The hand is flexed upon the wrist, the elbows and knees are bent, the head droops forward and the back is bowed. The gait is peculiar—the patient leans forward and in order to maintain his center of gravity goes faster and faster until he "brings up" against something or straightens himself by a supreme effort. This is called festination. Or he may show a tendency to fall backward, under slight provocation—known as retropulsion.

The face becomes fixed, mask-like and expressionless, giving a characteristic appearance to the facies, known as Parkinson's mask. Saliva may dribble from the mouth. The voice is slow and hesitating, sometimes stuttering, yet high in pitch. The intellect is unaffected. There may be some sensory disturbances, such as numbness, tingling, a sense of heat or excessive sweating.

DIAGNOSIS.—The continuous tremor, the mask-like expression and the characteristic gait (festination) make a clinical picture which cannot easily be mistaken.

In multiple sclerosis there is tremor, but it is usually absent during rest and is excited by attempted movements; there is "scanning speech," nystagmus, absence of the characteristic attitude and expression seen in paralysis agitans.

Chorea usually attacks children, and the movements are irregular, not rhythmical, generalized and usually attack the face.

PROGNOSIS.—Paralysis agitans is incurable, but does not often cause death. It commences late in life and usually grows slowly

and progressively worse, the patient finally dying of some other malady.

TREATMENT.—The patient's general health should receive appropriate treatment. Avoidance of excitement or overwork, freedom from anxiety, a life spent in the open air, a nutritious diet, hydrotherapy, massage and electricity will help to improve his condition. Tonic drugs, such as iron, arsenic, strychnin and phosphorus should be taken as indicated by the individual requirements. Potassium iodid seems to be beneficial in some cases and potassium bromid, hyoscin hydrobromid ($^1/_{100}$ grain), atropin ($^1/_{100}$ to $^1/_{60}$ grain) and codein ($\frac{1}{4}$ to $\frac{1}{2}$ grain) are sometimes useful in controlling the severity of the tremors.

PAROTITIS—See Mumps.

PEDICULOSIS; LOUSINESS.

DEFINITION.—An irritation of the skin caused by the presence of lice and characterized by itching and an eruption.

VARIETIES.—(1) Pediculosis capitis or head-lice; (2) pediculosis corporis or body-lice; (3) pediculosis pubis or crab-lice.

ETIOLOGY.—The disease is contagious, the lice being transferred from one person to another by contact or by infested clothing or bedding. Head-lice are most frequent in children; the other forms are usually found in adults. The poorer classes are the chief sufferers.

Each variety is due to a different variety of the parasite. The pediculus corporis makes its habitat in the hair of the head and there deposits its ova or "nits," which are attached to the hair cylinders; these hatch out in three to eight days. The head louse is a gray insect one to two millimeters in length. The pediculus corporis is a larger variety and resides and deposits its ova in the clothing, chiefly in the seams of the undergarments. The symptoms are caused by excursions to the patient's body, from which the parasites derive their nutrition. The ova hatch in about six days. The pediculus pubis is the smallest variety and resides chiefly in the hair of the genital region. It attaches itself to a hair-shaft with its head reaching downward into the follicle. The ova are also made fast to the hairs.

SYMPTOMS.—Itching is the principal symptom in all forms of pediculosis. In the futile effort to obtain relief the skin is often torn by the finger-nails. Papules and pustules are often observed, or, in hairy regions, the skin will be covered with crusts.

Pediculosis capitis usually attacks the back part of the head; rarely there may be lesions beyond the border of the hairy scalp. In severe cases there is sometimes enlargement of the lymphatic glands. A careful examination of the scalp will reveal the presence of the parasites and of the "nits" clinging to the hairs.

The *pediculi corporis* will not be found upon examination of the skin, but must be sought in the clothing. The crawling of the lice excites itching and upon examination reddened points will be found upon the skin where the louse has attached itself in order to suck up its food. The lesions are most common where the clothing is tight—at the waist and neck bands, the back, shoulders and outside of the thighs.

Pediculosis pubis is usually acquired during the sexual act and excites itching in the genital region. Sometimes (but not often) these parasites are found on the eyebrows, in the axillae and other hairy regions. The itching is usually not so severe as in the other forms and the skin is not so likely to be torn. Examination discloses the lice, which are small, thicker proportionately than the other varieties and crab-like in shape (hence called "crab-lice"). They attach themselves to the hair-shafts very tightly and are removed with difficulty.

DIAGNOSIS.—Pediculosis may be mistaken for eczema or pruritus. The discovery of the parasite definitely settles the diagnosis. It should be remembered, however, that long-continued irritation of a part or the use of too severe local measures for relief may cause a real eczema.

PROGNOSIS.—Properly treated, lice are readily removed.

TREATMENT.—Head-lice are most quickly removed by shaving the head or cropping the hair very closely, then scrubbing it thoroughly with a strong alkaline soap and hot water; surgeon's etherial soap is very effective. Or they may be removed by soaking the hair with common kerosene oil for twenty-four hours, keeping it covered at night with a rubber cap. If the

kerosene proves too irritant it may be diluted with olive oil or crude petroleum may be used instead. The head should be thoroughly washed after the application. Walker recommends that if the scalp is much irritated the following ointment be used for a day or two until the inflammation subsides:

Ammoniated mercury .....gr. 10—30
Lard .....oz. 1

Kaposi recommends:

Petroleum (crude).....dr. 5
Olive oil.....dr. 2½
Balsam Peru.....dr. 1

Many other remedies are used. Shoemaker recommends beta-naphthol for all forms of pediculosis. It may be used in the following formula:

Beta-naphthol .....dr. 1
Vaselin .....oz. 2.

Mercurial ointment is a favorite remedy with some. Other applications are carbolic acid in water or vaselin, solutions of bichlorid of mercury, staphisagria in an ointment (1 dram to the ounce of vaselin), sulphur ointment or powdered sulphur, and pyrethrum (insect powder).

To remove the "nits" dilute acetic acid, vinegar, alcoholic solutions or mild alkaline solutions should be frequently used. They may be combined with an active parasiticide, as in the following:

Fl. ext. staphisagria.....dr. 2
Dilute acetic acid.....oz. 4
—Schamberg.

Or—

Mercuric chlorid .....gr. 15
Dilute acetic acid.....oz. 8
Water, enough to make.....oz. 16
Use as a wash.

In mild cases the fine-tooth comb is a most effective instrument for the removal of lice and "nits."

For pediculosis corporis the main thing is to destroy the lice and ova. These are located in the clothing and bedding, which should be thoroughly boiled or baked. The patient should take a hot bath, scrub himself with soap and water and apply a parasitic lotion or ointment (any of the above) to the body

to destroy any stray parasites. Sulphur and staphisagria are especially recommended. A bland application may be needed if the skin is inflamed or torn.

Pediculosis pubis is treated on the same general principle as lice of the head. First scrub the part thoroughly with soap and water and then use one of the parasiticide lotions; the formulas containing staphisagria and corrosive sublimate are satisfactory. Mercurial ointment is a favorite application but is uncleanly. The "nits" are removed as already directed.

PEMPHIGUS.

DEFINITION.—An inflammatory disease of the skin characterized by the occurrence of successive crops of blebs or bullæ.

VARIETIES.—There are two common forms—pemphigus vulgaris and pemphigus foliaceus.

ETIOLOGY.—Pemphigus is more common in females than in males. Predisposing causes are debility, overwork, nervous exhaustion and injuries to the nerves. Microörganisms are thought to have an influence in its production, but the disease does not seem to be contagious. It is uncommon in this country.

PATHOLOGY.—Vesicles or blebs are formed between the horny layer of the skin and the reta mucosum; they contain an alkaline fluid which is at first serous and later becomes purulent. There is vascular dilation and leukocytic infiltration of the cutaneous tissues.

SYMPTOMS.—In pemphigus vulgaris the eruption comes out in successive crops, each consisting of five or six or more rounded bullæ or blebs, varying from the size of a pea to that of an egg and distended with fluid; this fluid is at first serous, but later becomes cloudy and purulent. It may be absorbed or the bleb may rupture, the course of each lesion lasting about a week. The base of the bleb is red, but there is no inflamed and reddened areola. There is moderate itching and burning. Any portion of the cutaneous surface of the body may be attacked and rarely the mucous surfaces—conjunctiva, mouth or vagina. The disease usually runs a chronic course, lasting sometimes for years and seriously undermining the health.

In pemphigus foliaceus the blebs rupture early and do not become distended. The accumulating, purulent fluid dries

upon the surface, forming crusts which are finally thrown off, revealing the reddened, inflamed corium beneath. The new crops succeed with great rapidity, often being implanted upon the same area as the old; nearly the entire surface of the body may be covered. There is some heat, burning and itching and the general health is often greatly impaired.

DIAGNOSIS.—In the bullous syphiloderm there is usually the characteristic history; there are thickened, yellowish crusts and underlying ulceration.

Impetigo contagiosa runs a rapid, acute course; the disease is contagious; the lesions are autoinoculable; and the blebs are often umbilicated.

In dermatitis herpetiformis the lesions tend to groups; they are smaller, more likely to be multiple more acute and are associated with great itching.

PROGNOSIS.—Not very favorable. The disease is usually chronic, often lasting for years, and may undermine the general health. Pemphigus foliaceus is often fatal.

TREATMENT.—The patient should be given the best hygienic regime possible, placed on a nutritious diet and tonic and reconstructive drugs administered. Arsenic, iron, quinin, strychnin, cod-liver oil, the hypophosphites and various other remedies of this class are often of value.

Local treatment consists in puncturing the blebs, expressing their contents and the application of bland and soothing ointments or lotions. Perfect cleanliness is, of course, required. Zinc oxid ointment, calamin lotion, the starch poultice (see Eczema), bran baths and in severe cases the continuous bath are the local remedies usually recommended.

PERICARDITIS.

DEFINITION.—An inflammation of the inner surface of the pericardial sac and the serous coat of the heart.

ETIOLOGY.—In a majority of instances pericarditis is met with as a process secondary to other diseases. About 50 per cent of cases accompany or follow acute articular rheumatism. It is also frequent in Bright's disease. It may become a complication in typhoid, scarlet fever and pyemia. Infectious processes from adjacent organs, such as pleuritis or pleuro-

pneumonia, may extend to the pericardium. The disease may occur at any age.

Pathology.—There may be three stages in this disease. A hypertrophic redness is followed by a dull and lusterless appearance, the result of a deposit of inflammatory lymph. The friction of the two surfaces may arrange the fibrous exudate in long shreds, giving a shaggy, hairy appearance to the heart. If resolution does not set in promptly there is commonly an effusion into the sac, which may become greatly distended. In favorable cases this is reabsorbed; in unfavorable, it may become purulent, caused by an invasion of pus organisms. Instead of an effusion there may be agglutination of the two layers, producing an adherent pericardium, which may result in cardiac hypertrophy. As a result of incomplete resolution there may remain sclerotic areas known as milk spots which are an outgrowth of connective tissue in the form of papillae.

Symptoms.—In the simplest or plastic form of this disease, or during the stage of roughening, there may be no symptoms or they may be masked by the coexisting disease. In other cases there may be a chill at the outset, followed by a rise of temperature, rarely above 102.5° F. If there is still fever from infection or inflammation in other parts the temperature becomes higher. Pain is variable. It may be sharp in character over the precordial or epigastric region and the first symptom to appear. At other times there is only a feeling of distress or sense of discomfort. Dyspnea may be present. The pulse is rapid and the patient nervous. He may complain of tenderness over the heart and may prefer a particular position. Pericarditis with effusion is often overlooked. When the attention is especially called to cases there is usually an aggravation of several symptoms. Pain is more apt to be present and may be of a stabbing character. There is greater dyspnea, greater rapidity of the pulse, with an irregular and disturbed action of the heart. Large effusions may produce dysphagia and aphonia, while the pulse may become more frequent during inspiration.

Physical Signs.—In the first stage the most important sign is a superficial friction sound. This is of a rough, grating character heard best over the middle of the heart. It is not

exactly synchronous with either the first or second sound and may last longer. It may be increased on pressure and may sometimes be felt by the hand.

In the stage of effusion inspection may reveal bulging intercostal spaces over the cardiac area. On palpation the impulse is found to be weak. There is an increased area of dulness in all directions. This area takes the form of a triangle with the base downward sometimes as low as the seventh rib. The heart sounds are feeble and muffled. Friction is no longer heard during this stage.

Diagnosis.—In pericarditis without effusion the diagnosis is made by attention to the general and local symptoms. If these are not carefully considered it may be difficult to distinguish the friction from a double heart murmur. It is of importance to remember that the friction sound is increased on pressure or on bending the patient forward. A pleural friction is modified or suppressed by holding the breath.

Pericardial effusion must be diagnosticated from dilation of the heart. In the latter condition the impulse is more distinct and the area of dulness is nearer the form of a square. The heart sounds are accentuated. No pressure symptoms can be developed. In effusion a small area of dulness with increased fremitus and bronchial breathing can be made out at the angle of the scapula when the patient is sitting up.

Prognosis.—Uncomplicated cases last from one to three weeks. In the adherent form the heart is left permanently impaired in a majority of cases. When the effusion becomes purulent there is usually a fatal result.

Treatment.—Rest is of first importance. If pain is marked, morphin in combination with atropin may be given by the mouth or hypodermatically. Tyson recommends a blister at least three inches square, as soon as the diagnosis is made, to prevent effusion and promote absorption. Several leeches may be applied over the heart for the same purpose. Hot or cold applications may follow this procedure. In sthenic cases, at the beginning of the attack veratrum viride may be given to depress the circulation and dilate the blood-vessels. It must be used with some care.

To prevent overfilling of the vessels and effusion, but little

drink of any kind should be allowed. The bowels should be moved at least twice daily, preferably by salines. Calomel in small doses, given regularly, seems to act favorably in preventing plastic exudation and the formation of adhesions. To prevent active purgation, small doses of opium may be administered at the same time. If the heart becomes feeble with cyanosis, heart stimulants such as strychnin and ammonia are indicated. If the heart muscle is weak it may not be advisable to give digitalis. To promote absorption, sodium and potassium iodid combined with the iron iodid are considered the most valuable remedies. Iodin or ichthyol in lanolin may be regularly applied externally at the same time.

When cyanosis and dyspnea are marked and the effusion is large it may be necessary to resort to cardiocentesis. The needle may be inserted in the fourth interspace at a point one inch to the left of the parasternal line or in the fifth one and one-half inch from the left sternal border. If the effusion becomes purulent incision and drainage is the proper procedure.

It must be remembered in the treatment of pericarditis that the primary disease must receive careful attention and the proper drugs used. Rheumatism may require the administration of salicylates until contraindicated by serious heart symptoms. The *diet* should be light and of a liquid form. In the stage of effusion it should consist largely of easily digested food.

PERITONITIS.

DEFINITION.—Inflammation of the peritoneum.

VARIETIES.—Peritonitis may be acute or chronic. If a small area of peritoneum is inflamed it is called a localized peritonitis; the most common form of this is Appendicitis (which see). If the inflammatory process is diffuse it is called a generalized peritonitis. Primary or idiopathic peritonitis is rare; the disease is usually secondary.

ETIOLOGY.—Peritonitis is always caused by infection with microörganisms, especially the pyogenic bacteria. These find their way into the peritoneal cavity, in most cases through a perforation somewhere in the course of the intestinal tract, as from an ulcer of the stomach, a typhoid ulcer, perforative appendicitis, dysentery, or a ruptured gall-bladder. An ab-

scess of any of the viscera (kidney, liver or spleen) may discharge into the cavity; a localized peritonitis (as in appendicitis may become diffuse; or the infection may proceed from septic inflammation of the Fallopian tubes, ovaries or uterus. Infection during abdominal operations under modern methods is rare. The germs may, in some instances, reach the peritoneum from an adjoining focus of inflammation through the lymphatics or blood-vessels. This may be the case in pleurisy or intestinal inflammation. More rarely the disease is secondary to rheumatism, gout, Bright's disease and tuberculosis.

Tubercle bacilli may excite an acute inflammation, but more frequently tubercular peritonitis is chronic. Streptococci excite the most violent inflammations. Traumatism and chemical irritants may also act as causes. The existence of a true idiopathic peritonitis is no longer generally credited. This was ascribed to exposure to cold and wet.

Pathology.—In the earlier stages the peritoneum loses its shiny appearance, becomes dull and lusterless, its vessels are congested and there is exfoliation of endothelium. An exudate is thrown out which may be serofibrinous, fibrinous, purulent or hemorrhagic; this varies greatly in quantity. Plastic adhesions take place between loops of intestine which become matted together. In localized peritonitis this plastic process is preservative, walling off the affected portion and preventing the spread of inflammation. A circumscribed abscess may be formed in this way, so as to be comparatively harmless.

In chronic peritonitis the membranes are thickened and adhesions are frequently very extensive; or there may be a considerable amount of fluid exudate without much adhesion, causing an ascites. This form is frequently tubercular, the membrane being thickly studded with tubercles. Cancer may cause chronic peritonitis. In the tuberculous and cancerous varieties the exudate is frequently bloody.

Symptoms.—*Acute General Peritonitis.*—The disease usually begins suddenly as a result of perforation or rupture of an abscess. The patient is seized with severe pain, referred first to the point of invasion, increasing in severity and finally becoming diffuse and agonizing in its intensity. This pain is increased by motion, by respiration and by pressure. The abdo-

men is intensely tender and in order to relax the muscles as much as possible the patient lies on the back with the legs drawn up. Usually the abdomen becomes greatly distended; in rare cases it is flat and hard. Vomiting is a prominent symptom and may occur at the beginning of the attack; it is often persistent, the contents of the stomach being first thrown up, then mucus and bile. Constipation is the rule, but there may be diarrhea. The urine is scanty and contains indican.

The disease is usually ushered in with a chill, followed by moderate fever (101° to 103° F.); it is rarely high. In asthenic cases the temperature may be subnormal throughout; in this form the pain may be slight or absent, but the depression is profound. The pulse is small, soft and rapid (120 to 160); the respiration is shallow and frequent (30 to 40). The position of the patient is characteristic. As already stated he lies on his back with the thighs flexed; the face is drawn and sharpened, the eyes deep in their sockets and the cheeks sunken. The mind usually remains clear almost to the end, just preceding which there may be slight delirium.

In *localized peritonitis* the symptoms are similar to those described, but less severe. There is pain, often vomiting, fever (sometimes high) and the local signs of inflammation. These, however, are circumscribed. Abscesses are frequently formed which may open into the general cavity, thereby transforming the condition into a diffuse inflammation, or they may open externally.

Chronic peritonitis presents less constitutional disturbance. Fever is absent, irregular or slight. Pain is not a prominent symptom. Physical examination reveals local tenderness and tumor-like masses and thickened membranes. There is disturbed bowel function—usually constipation; diarrhea is the rule in tuberculous peritonitis. Sometimes there is jaundice and quite frequently ascites, especially if the case is tuberculous. Anemia, emaciation and debility may be marked.

Physical Signs.—Inspection in acute diffuse peritonitis shows the abdomen to be distended. If there is ascites the abdomen is widened—broadened out at the flanks.

Palpation shows tenderness and muscular rigidity.

Percussion at first elicits a tympanitic note; later there may

be lateral dulness due to the presence of fluid, and changing its level as the patient's position is changed.

DIAGNOSIS.—The most characteristic symptoms are the severe pain, bilious vomiting, a distended, tender abdomen, the drawn and sharpened features, the rapid pulse and the evidences of great depression. In asthenic cases the symptoms are less distinctive.

Intestinal obstruction presents no fever until late, the pain is paroxysmal, tenderness is much less marked, there is vomiting of fecal matter, and gurgling and splashing sounds may be heard upon auscultation.

In acute enteritis there is much less pain, tenderness and abdominal distension. Constitutional depression is not so great. There is usually diarrhea.

Hysterical peritonitis may closely simulate true peritonitis. It occurs only in hysterical women. The subjective symptoms are often exaggerated as compared with the constitutional disturbance.

PROGNOSIS.—Usually fatal within a few days unless the process is localized. Non-septic cases may recover. Surgical intervention at the beginning of the attack may sometimes save the patient's life. Circumscribed peritonitis is more hopeful and is usually amenable to surgical treatment. The chronic forms are also very fatal. Tuberculous peritonitis is sometimes cured by operation.

TREATMENT.—If the peritonitis is due to perforation in the intestinal tract the greatest hope lies in immediate surgical intervention. By this means many lives may be saved; without it, the disease is almost inevitably fatal. The saline cathartics are the most useful drugs in nonperforating cases but should not be given after rupture into the peritoneal cavity. They possibly reduce the peritoneal congestion and carry off some of the fluid exudate. One or two drams of Epsom or Rochelle salts should be given every two or three hours. Small doses of calomel are sometimes given early in the attack. According to Anders this is used to defibrinate the exudations and the blood of the patient.

The opium treatment introduced by Alonzo Clark consisted in saturating the patient with this drug, thereby checking peri-

stalsis, reducing the respiratory rate to 10 or 12 per minute, keeping him in a stupor and making him unconscious of pain. It is no longer used. Opium or morphin may, however, be used in small doses to control the pain and check peristaltic movements. It is most useful in perforative cases.

In grave cases the subcutaneous injection of normal salt solution is sometimes of decided value. It serves to dilute the toxins and promotes their excretion through the natural channels. Antistreptococcic serum has been used with good results in a few cases.

Vomiting is controlled by hypodermics of morphin, or by cracked-ice or iced champagne. Stimulants are frequently required to maintain the failing vital powers. Strychnin, nitroglycerin, digitalis and alcohol are the drugs commonly used.

Local Treatment.—Cold in the form of cold cloths or the ice-bag may be applied to the abdomen or, if the patient prefers, hot compresses or light poultices may be used. Turpentine stupes are useful in case of tympanites. The gas may also be evacuated by the long rectal tube or by enemas containing turpentine. Leeches are sometimes applied to the abdomen in the early stages. Blisters are now little used and are generally objectionable.

In *chronic peritonitis* the treatment is largely dietetic and hygienic. Healthful surroundings, mental and physical relaxation and a generous but non-fermenting diet are indicated. The iodids internally and applications of iodin, ichthyol and other counterirritants externally may be tried. The following formula is recommended by Anders:

Ichthyol ointment .....dr. 6
Comp. iodin ointment.....dr. 6
Belladonna ointment, enough to make.....oz. 2

In very many cases, however, a surgical operation is necessary. The fluid may be removed by tapping, but often more radical measures must be employed.

PERTUSSIS—See Whooping Cough.

PHARYNGITIS, ACUTE.

DEFINITION.—An acute inflammation of the pharynx and adjacent parts. It is usually associated with tonsillitis (which see).

ETIOLOGY.—Acute pharyngitis is usually excited by exposure to cold or damp or by sudden changes of temperature. The inhalation of irritant gases or vapors may also cause it. It is more common in children than in adults and some individuals are peculiarly susceptible. Rheumatism is frequently a predisposing factor; other factors are lithemia, scrofulosis and debilitated conditions. Sore throat may also be a symptom of scarlatina, diphtheria, measles, smallpox and other diseases.

SYMPTOMS.—An acute attack of pharyngitis may be ushered in with slight chilliness, followed by some elevation of temperature, flushing and dryness of the skin, and headache. The symptoms of the affection include a sense of local soreness and dryness, pain on swallowing, a constant desire to "clear the throat," and a slight cough. If the inflammatory process extends to the Eustachian tube it will cause some difficulty in hearing; if the larynx is affected, hoarseness will be the result. The muscles of the neck become stiff and its movements are painful. The soreness and pain are likely to be especially severe in rheumatic sore throat—out of proportion to the inflammatory changes.

Upon examination the pharynx and usually the tonsils and other adjacent mucous surfaces are found to be red and swollen. The period of dryness is soon followed by one of hypersecretion, when considerable sticky mucus will be found upon the inflamed surfaces. In some cases the mucous follicles may become inflamed and enlarged; if they rupture ulcers may be formed.

DIAGNOSIS.—This offers no difficulty; still the possibility of diphtheria should always be considered at the inception of any disease of the throat. Pharyngitis may be associated with tonsillitis or laryngitis.

PROGNOSIS.—Simple sore throat never causes death.

TREATMENT.—An attack of pharyngitis may sometimes be

aborted if it is treated energetically at its inception. Rest in bed, a hot foot bath or vapor bath, a laxative dose of calomel followed by a saline and a full dose of Dover's powder (5 to 10 grains for an adult) will sometimes prove effective. Quinin sulphate (3 to 10 grains) also has a good reputation in these cases; it should be given early. Combinations of aconite and belladonna with other drugs are much in vogue in all forms of acute pharyngeal and nasal catarrh. The aconite equalizes the circulation and the belladonna checks the local congestion. The following formulas are popular:

Atropin sulphate .....gr. $^1/_{600}$
Tinct. aconite .....gtt. 1
Calomel .....gr. $^1/_6$
Morphin sulphate .....gr. $^1/_{36}$

One tablet. Take every hour for five or six doses, or until it produces slight dryness of mouth and throat, then every two or three hours.

Quinin sulphate .....gr. 12
Dover's powder .....gr. 12
Camphor .....gr. 6
Tinct. belladonna .....m. 12
Tinct. aconite .....m. 6

Make 12 capsules. One every two hours until slight physiological effects are produced, then at longer intervals.

Rheumatic patients (many cases of sore throat are caused by rheumatism) should be given the salicylates in full doses (30 to 60 grains daily), guaiac or other anti-rheumatic remedies. The following formula has been recommended:

Tinct. aconite .....m. 30
Tinct. belladonna .....m. 30
Ammon. tinct. guaiac.....dr. 5
Syrup lemon .....dr. 4
Cinnamon water, enough to make.....oz. 4

Teaspoonful every three hours.

When the disease is established *local treatment* is of the greatest value. At the beginning, cold compresses or an ice-bag should be applied externally and the throat gargled with ice water or small pieces of ice allowed to dissolve in the mouth. Astringent and antiseptic lozenges, gargles and sprays are useful. Chlorate of potash is most used; alum, tannic acid, tincture of iron, ammonium chlorid, rhus glabra, hamamelis, hy-

drastis, myrrh, boric acid, listerine, glyco-thymoline, etc., are other common remedies. They may be variously combined, as in the following:

Potassium chlorate	dr. 3
Tinct. iron chlorid	dr. 1
Glycerin	oz. ½
Distilled water, enough to make	oz. 3

Teaspoonful to be gargled and then swallowed every two hours.

Fl. ext. rhus glabra	oz. 1
Potass. chlorate	dr. 2
Glycerin	oz. ½
Listerine	oz. 1
Water, enough to make	oz. 6

Use as a gargle every two hours.

Chlorate of potassium and ammonium chlorid are much used in lozenge form, being allowed to dissolve slowly in the mouth. The following lozenge is also useful:

Ext. rhus glabra	gr. 5
Potassium chlorate	gr. 2
Powd. red rose leaves	gr. 1
Powd. pomegranate bark	gr. 2
Sugar, enough to make	gr. 15

In rheumatic sore-throat a guaiac lozenge or ammoniated tincture of guaiac, a teaspoonful in half a glass of milk as a gargle should be employed.

If there is considerable mucus an alkaline gargle or spray gives most relief. Dobell's solution may be used, glyco-thymoline, diluted in two or three parts of water, or the following:

Sodium borate	gr. 40
Tinct. myrrh	dr. 1
Listerine	oz. 1
Glycerin	oz. ½
Water, enough to make	oz. 4

If there is much tickling and irritation of the throat relief may be obtained by the use of remedies containing cocain or menthol. The cocain may be applied directly to the throat in a 2 per cent solution, and the menthol may be used with a spray of liquid petrolatum, or the following tablet may be tried:

Cocain hydrochlorate .....gr. $^1/_{12}$
Potassium chlorate .....gr. 2
Ammonium chlorid .....gr. 1
Ext. licorice .....gr. 2
Oleo-res. cubebs .....gr. $\frac{1}{8}$
Allow this to dissolve slowly in the mouth.

If very decided astringency is needed, stronger applications may be made directly to the inflamed part, such as glycerol of tannin, nitrate of silver solution (10 to 20 grains to the ounce), or a mixture of equal parts of tincture of iron chlorid and glycerin. Inhalations of hot steam, which may be medicated with tincture of benzoin, sometimes give decided relief, especially during the dry stage.

PHTHISIS—See Tuberculosis.

PILES—See Hemorrhoids.

PIMPLES—See Acne.

PLAGUE—See Bubonic Plague.

PLEURISY; PLEURITIS.

DEFINITION.—Inflammation of the serous membrane lining the pleural cavity and covering the lung.

VARIETIES.—The disease may be subdivided in a number of ways: (1) According to the morbid condition, it is (a) fibrinous or dry, (b) sero-fibrinous, or pleurisy with effusion, (c) purulent, or empyema. (2) If the pleural cavity is separated into chambers by adhesions, we have sacculated or encysted pleurisy; if the fluid pulsates from contact with the heart it is called pulsating pleurisy. (3) According to cause, the disease may be (a) primary or (b) secondary. (4) According to course it may be (a) acute or (b) chronic.

ETIOLOGY.—Pleurisy may occur at any age but is most common in young adults and especially in males; empyema is more likely to occur in children. In the primary form of the disease the onset is usually precipitated by exposure to cold—less frequently by traumatism.

Pleurisy is always caused by bacterial infection. The tubercle bacillus is probably most frequently responsible for the disease

—perhaps in one-third the cases. Next in order of frequency are the pneumococcus and streptococcus. Among other germs which may be present are the staphylococcus, the colon bacillus, the typhoid bacillus and the gonococcus.

Pleurisy may also result from the extension of a neighboring inflammation, especially from the lungs (pneumonia, pulmonary abscess or phthisis); or it may be secondary to general diseases, such as acute rheumatism, Bright's disease, tuberculosis, carcinoma, septicemia or the acute infective fevers.

PATHOLOGY.—At the beginning of the disease the pleura becomes congested, usually over a circumscribed area, a thin layer of lymph is thrown out and the membrane loses its shining appearance. This exudate increases rapidly in thickness, forming a fibrinous layer which makes the surface appear rough and shaggy. If little or no serous exudate is thrown out and the inflammation ceases at this point, the disease is known as *dry or fibrinous pleurisy*. The exudate may be entirely absorbed but more frequently there is an emigration of leukocytes into it and connective tissue formation, while the opposed surfaces of the pleura form adhesions.

In other cases the morbid process continues, the serous exudate is large and a considerable quantity of fluid accumulates in the pleural cavity. This form constitutes sero-fibrinous pleurisy or *pleurisy with effusion*. This fluid is straw-colored, alkaline in reaction, albuminous and generally contains flocculi or shreds of fibrin. Sometimes it is blood-stained (hemorrhagic pleurisy). The amount of fluid in the pleura may be so large as to greatly compress the lung and displace the heart and great vessels. In favorable cases the serum may be absorbed.

In *empyema or purulent pleurisy* there is infection with pus microbes. This may be the primary cause of the disease or the infection may be implanted upon one of the previous forms. The inflamed membrane is thickened, grayish in color, with a suppurating, granulating surface. The fluid consists of yellow pus and may be thick or thin. It often causes compression of the lung and displacement of the thoracic viscera.

SYMPTOMS.—The disease usually begins suddenly with a chill followed by moderate fever (101° to 103° F.) and a rapid pulse. The most prominent symptom is pain in the side, of a

severe stabbing character, increased by the respiratory movements and aggravated by the short dry cough which is present. The pain is usually felt in the neighborhood of the nipple or in the axillary line, but may be referred to the abdomen or back. The breathing is accelerated, shallow and restricted, on account of the pain caused by the excursion of the lung. The patient endeavors to suppress the cough for the same reason. The disease may not go beyond the dry stage. In some cases, instead of appearing abruptly and running an acute course, the early symptoms are masked and insidious. This is more likely to be the case when the disease is secondary.

The effusion usually makes its appearance in two to five days. Coincident with this, pain is relieved or disappears, but the rapidity of pulse and respiration continue and some elevation of the temperature remains. If much fluid accumulates in the chest it causes dyspnea from compression of the lung. In the majority of cases of pleurisy with effusion, however, the onset is insidious, the course slow and constitutional disturbance is marked but subacute in type. In favorable cases the acute symptoms subside in a week or ten days and the fluid is absorbed within a month or six weeks. In other cases, in spite of repeated aspiration, the exudate may persist for months. This is especially likely to be the case in tubercular pleurisy.

In *empyema* the symptoms are more severe. If there is primary infection there is a severe chill and high fever at the onset. Cough, dyspnea and pain in the side are present. In the secondary cases the appearance of the symptoms is more gradual. There are the usual evidences of sepsis, including chills, irregular fever, sweating and prostration. The patient becomes very weak, anemic and emaciated. In some cases he develops a typhoid state which may prove fatal within a few weeks; in other cases the disease may become chronic, lasting for months or years. There is leukocytosis.

Physical Signs.—*Dry Stage.*—Upon inspection the patient is seen to lie upon the affected side for the relief of pain. The movement of this side is restricted.

Percussion shows the resonance of the lung to be normal.

Upon auscultation a friction sound is heard at the close of respiration over the affected area—usually in the inframammary

or axillary region. This sound is audible only for a few hours, or prior to the appearance of the effusion.

Stage of Effusion.—A small quantity of fluid produces no physical signs which can be readily detected. With moderate or large amounts the following signs are obtainable:

Inspection.—The patient lies upon the affected side, which is immobile. The intercostal spaces are obliterated and may bulge out. The apex beat of the heart is displaced. In empyema there may be local edema and redness. Upon the left side the fluid may pulsate, simulating aneurism.

Palpation.—Immobility of the chest and obliteration of the intercostal spaces may be determined. The vocal fremitus is decreased or absent. (May be retained in young children or if there are adhesions which bridge the affected area.) The apex beat is found to be displaced.

Percussion.—There is dulness over the fluid. The upper level of this dull area changes with the position of the patient unless the pleural cavity is entirely filled or the fluid is encysted. Where the cavity is moderately full the upper line of dulness is not horizontal but follows a curved line like the letter S. It begins "relatively low down in the back, passes upward from the vertebral column, and soon turns upward and proceeds obliquely across the back to the axillary region, where it reaches its highest point; thence it advances in a straight line, but with a slight descent, to the sternum." (Calvin Ellis.) This is due to the fact that the fluid fills and conforms to the boundaries of the pleural cavity. In very small or very large effusions these lines are not followed. Above the level of the fluid, the compressed lung gives a tympanitic or a subtympanitic sound upon percussion (Skoda's resonance). When the lung is much compressed the percussion must be light, yet sharp, to distinguish fluid dulness from lung flatness. A large quantity of fluid may cause bulging downward of the diaphragm, with obliteration of Traube's triangular space (occupied by the fundus of the stomach) if the left side is affected.

Auscultation.—The respiratory sounds over the affected area are diminished or absent, except that bronchial voice and breathing may sometimes be heard indistinctly at the upper level of the fluid; over the compressed lung there is bronchial or bron-

cho-vesicular breathing but the respiratory sounds are much less distinct than on the well side. There may be egophony. When the fluid has disappeared friction sounds often return.

DIAGNOSIS.—During the dry stage pleurisy may be confounded with intercostal neuralgia or muscular rheumatism.

Intercostal neuralgia is unattended by fever or cough, pain is localized, there are tender points along the line of the nerve, and there may be a herpetic eruption over it. Friction sounds are absent. In muscular rheumatism there is no fever, pain is increased by motion, coughing or breathing, but relieved by uniform pressure. Friction sounds are absent.

The disease with which pleurisy is most likely to be confused is pneumonia, especially when the patient is examined during the stage of effusion.

PLEURISY WITH EFFUSION.	LOBAR PNEUMONIA.
Commences suddenly or gradually; slight chilliness lasting for days.	Commences suddenly; severe chill often lasting an hour.
Fever moderate; slight acceleration of respiration and pulse.	Fever high; both pulse and respiration greatly accelerated.
Mahogany flush absent	Mahogany flush over cheek bones.
Sputum absent or scanty; never rusty.	Rusty sputum.
Vocal fremitus diminished or absent.	Vocal fremitus increased.
Dulness very great and always present at base; Skoda's resonance above.	Dulness less marked and confined to affected lobe or lobes.
Heart and great vessels displaced.	Heart not displaced.
Breathing sounds diminished or absent; no rales; friction sound present early, disappearing when effusion appears.	Bronchial breathing; crepitant rales; no friction sound.
Slight prostration.	Marked prostration.

The most valuable diagnostic test is obtained by introducing an aspirator into the pleural cavity and ascertaining positively the presence of fluid. This gives information not only as to the nature of the disease but as to the character of the effusion. The needle is inserted with the patient in a sitting posture,

the hand of the affected side being placed upon the opposite shoulder. The point of insertion is usually in the sixth interspace on the right side and the seventh on the left, in the axillary line or posterior to this near the angle of the scapula in the seventh or eighth interspace. The operator may fail to obtain fluid at the first attempt on account of the blocking of the needle by fibrin shreds or because the fluid is encysted. Several efforts should be made if necessary. The greatest aseptic care should be exercised. If the quantity of fluid is very great it should not all be removed at the first operation, on account of the serious symptoms sometimes produced. When coughing, faintness or pain occur, or blood appears, the withdrawal of fluid should be immediately stopped.

Pericardial effusion is sometimes mistaken for pleurisy. The heart is not displaced, the apex beat diffused, its action weak, and there is dyspnea.

Hydrothorax is usually associated with disease of the heart and liver, and is bilateral.

Abscess of the liver may increase the dulness of that organ upward. The history, the immovable outline, the normal resonance of the lung behind and the presence of a friction-rub over a large area of the tumor suggest abscess.

Prognosis.—A simple dry pleurisy is seldom dangerous to life. Pain, fever and other evidences of the disease usually subside within a few days, or, if there is slight effusion, within a few weeks. When there is considerable fluid, absorption is likely to be slow and the course of the disease may be greatly prolonged, the patient becoming anemic and debilitated. Still, uncomplicated cases of sero-fibrinous pleurisy generally recover, though convalescence is often tedious. Empyema is a serious and dangerous disease. The fact that many cases of pleurisy are tubercular should be kept in mind; while these are not necessarily fatal they are often extremely grave and may be very chronic in course. In tubercular pleurisy the effusion often contains no bacteria. Streptococcal infection is attended with a high mortality (25 per cent—Salinger and Kalteyer). Pneumococcal cases generally run a favorable course.

The disease sometimes assumes a chronic type, either with some purulent effusion or dry. Subjective symptoms may be

absent or there may be slight irregular fever, sweats and debility. Extensive adhesions may cause deformity of the chest.

TREATMENT.—During an acute attack of pleurisy the patient should be kept quietly in bed and placed upon a light diet. Aconite or veratrum viride may be given if the temperature is high and the pulse full, but as a rule cardiac depressants are not required.

The pain and cough are best relieved by the administration of opium in some form. In mild cases Dover's powder, heroin ($^1/_{12}$ grain) or codein ($^1/_6$ to $\frac{1}{4}$ grain) answer the purpose; severe cases require hypodermics of morphin. Sometimes the coal-tar drugs give sufficient relief, but on account of their depressing effect they should not be given in large doses. In cases of moderate severity the following is effective:

Codein sulphate	gr. 3
Quinin sulphate	gr. 24
Caffein citrate	gr. 6
Acetanilid	dr. ½

Make 12 capsules. One every three hours.

Quinin has a salutary effect upon the course of inflammation of serous membranes. It should be given in 3 to 4 grain doses every three or four hours. Opium possesses the same property. Bartholow suggests the following to cut short the course of an incipient pleurisy:

Morphin sulphate	gr. ¼
Quinin sulphate	gr. 15

To be taken at a single dose.

A formula recommended by Da Costa which has the advantage of combining diuretics and diaphoretics, thereby lessening the probability of effusion, is:

Morphin acetate	gr. ½
Potassium acetate	oz. ½
Tinct. veratrum viride	m. 24
Syrup tolu	oz. ½
Sol. potassium citrate	oz. 2½

Dessertspoonful every three hours.

Sodium salicylate in full doses is valuable in rheumatic patients.

Local treatment not only adds to the patient's comfort but may modify the inflammation and decrease the quantity of

effusion. If fever is high the ice-bag or the ice-coil may be applied with advantage. Most patients prefer warm applications. Among those used are hot fomentations, the linseed poultice (to which a little mustard may be added if thought desirable), the mustard draft, and a number of small blisters. If the patient's strength is good excellent results follow the abstraction of blood by the application of three to six leeches to the painful area, or the use of wet cups. The greatest relief is probably obtained by strapping the chest with adhesive strips. These should be two to two and one-half inches wide and applied one at a time, slightly overlapping each other, over the affected half of the chest. They should be long enough to reach from spine to sternum and should be put on during expiration. They not only relieve the pain but diminish the quantity of exudate.

To hasten absorption of fluid counter-irritation to the chest is continued on a more vigorous scale. Blisters are more frequently used at this stage. In using a blister, after the vesicle has formed, a poultice should be applied in order to promote the abstraction of fluid. Tincture iodin may be painted over the affected portion of the chest for the same purpose. A formula recommended by Anders contains:

Ichthyol ointment (12 per cent).....dr. 6
Comp. iodin ointment.....dr. 6
Belladonna ointment, enough to make.....oz. 2
Apply twice daily.

Iodin is also used internally to hasten absorption. It may be given either in the form of potassium iodid (5 grains three times a day), or, to children, in the syrup of iron iodid.

Potassium iodid .....dr. 1
Syrup iron iodid.....dr. 2
Comp. syrup sarsaparilla.....oz. 1
Essence pepsin, enough to make.....oz. 2
Teaspoonful every four hours. Double the dose in four days if well tolerated.

Other measures to hasten absorption of the fluid exudate are restriction of the quantity of fluids which shall be drunk and stimulation of the emunctories. Catharsis, with watery stools, is produced by a daily morning dose of Epsom salts or a nightly dose of calomel or compound jalap powder.

The diuretics are also used and include potassium acetate,

citrate, nitrate and bitartrate, sweet spirits of niter, digitalis, caffein and diuretin. The following formula is suggested:

Potassium citrate .....oz. ½
Infus. digitalis .....oz. 3
Two tablespoonfuls every three or four hours.

Sweating may be produced by the use of the hot vapor bath, or, if the patient is robust, by the administration of pilocarpin internally or hypodermically.

Aspiration is required if no reduction of the fluid is noticed after a week or ten days. It may also be demanded by certain urgent symptoms, including excessive accumulation of fluid, marked dyspnea, great displacement of the heart, double pleurisy and in empyema as soon as the condition is recognized. The operation should be performed as directed under Diagnosis. In children or in adults who cannot sit up it may sometimes be advisable to puncture the cavity one or two interspaces higher than directed. After aspiration the absorptive power of the pleura is often greatly increased, with the result that the residual fluid is quite rapidly taken up. It is usually necessary to perform the operation a number of times.

The *treatment of empyema* is practically the same as already outlined, except that the necessity for thorough drainage is greater. This often demands a much more radical operation—the resection of a rib—though at times a large trocar and canula, as designed by Ingals, may be introduced between the ribs and a drainage tube left in place. Usually, however, the interval between the ribs is too small to permit the insertion of a tube large enough to drain the cavity thoroughly. The details of Estländer's and other operations for resection of a rib will be found in works on surgery.

The treatment during convalescence aims to restore the strength and increase the expansive power of the shrunken lung. To meet the first indication, the patient should be put upon a generous diet and given light outdoor exercise or indoor gymnastics. Cod-liver oil, malt, and the tonics, including quinin, strychnin, iron and arsenic should be prescribed as indicated. Creosote gives good results in tubercular patients. Breathing exercises, regularly performed, will increase the capacity of the lung and help restore it to its previous efficiency.

PNEUMONIA, CHRONIC INTERSTITINAL.

DEFINITION.—A chronic inflammatory disease of the lung characterized by an abnormal growth of fibrous connective tissue.

ETIOLOGY.—The disease is usually secondary, especially to broncho-pneumonia. It may follow croupous pneumonia or pleurisy if resolution is delayed. Other causes are prolonged pressure by tumors or accumulated pleural fluids which compress the lung. It is often tubercular (fibroid phthisis) and may be a local expression of syphilis. Primary causes are the inhalation of irritant dusts from coal-mines, stone-quarries, steel-grinding and iron-working. This form is known as *pneumokoniosis.*

PATHOLOGY.—The affected lung is greatly reduced in size and is retracted to the upper and posterior portion of the pleural cavity. Often the thoracic and visceral pleurae are found adherent. The cut surface of the lung is hard, resistant, grayish in color and its alveoli nearly or quite obliterated by fibrous connective tissue. The bronchi are often greatly dilated (*bronchiectasis*) and the blood-vessels prominent. There are often cavities, especially if tuberculosis is present. The heart is enlarged and more or less compensatory emphysema of the other lung is present.

SYMPTOMS.—The prominent symptom is the chronic cough which persists throughout the course of the disease. The expectoration may be mucus and slight or muco-purulent and very profuse. The latter occurs if bronchiectasis supervenes or if cavities are developed in the lung. In such cases it may become fetid. Dyspnea is present in varying degree but is usually not very severe. Fever is generally absent. There is loss of strength and emaciation.

Physical Signs.—Inspection.—The affected side of the chest is retracted and its movement restricted. The unaffected side is unnaturally full. The apex beat of the heart is displaced toward the diseased side.

Palpation.—Expansion of the lung is not equal to that of the opposite side. Vocal fremitus is increased unless the pleura is greatly thickened, in which case it may be decreased.

Percussion.—There is dulness except over the dilated bronchi or cavities where the sound is tympanitic.

Auscultation.—The vesicular sounds are feeble or absent. There is bronchial breathing and a cavernous or amphoric sound over cavities or dilated bronchi.

Prognosis.—The disease is incurable but it often persists for many years.

Treatment is purely symptomatic. Bronchitis and the attendant cough should receive the care directed for all chronic affections of that character. Nutritious food, warm clothing and residence in an equable climate are desirable.

PNEUMONIA, LOBAR; CROUPOUS PNEUMONIA.

Definition.—An acute infectious disease in which the air-cells of the lung are filled with an inflammatory exudate, producing pulmonary consolidation and severe constitutional disturbance.

Etiology.—Pneumonia occurs in all countries but is most common in temperate climates. Nine-tenths of the cases occur during the winter and early spring. All ages are affected but it is relatively more common in the very young and old. After sixty it is a very fatal disease. Males suffer more frequently than females, probably because they are more liable to exposure. In negroes the mortality is higher than in whites. The individual's surroundings, habits and physical condition modify the susceptibility. Improper hygiene and ventilation, overheated living rooms and overcrowding predispose to the contraction of pneumonia. Alcoholism favors its occurrence and increases its danger. It is sometimes a complication of other diseases, such as typhoid fever, measles, malaria, cerebro-spinal fever, Bright's disease, etc. The exciting cause is in most cases exposure to cold or wet. It may be caused by the inhalation of ether during surgical operations. Catarrhal conditions favor the implantation of the specific germ. It is rarely excited by injuries.

Pneumonia is caused by the diplococcus pneumoniae, discovered by Fränkel, also known as the pneumococcus and the micrococcus lanceolatus. Other bacteria are frequently found in the sputum, including the streptococcus, the staphylococcus, the

bacillus typhosi, the bacillus diphtheriae, Friedlander's bacillus pneumoniae, and the influenza bacillus. Some writers have described special types of pneumonia as due to these bacteria—such as streptococcic pneumonia, staphylococcic pneumonia, etc.

There is now quite general agreement that, while most cases of pneumonia are sporadic, the disease is actively contagious and may be transmitted from one person to another by direct contact, or by infection of clothing, bedding or rooms. Numerous cases of this kind have been reported. The sputum undoubtedly transmits the germs.

An attack confers no immunity.

PATHOLOGY.—In the vast majority of cases only one lung is attacked; this is more frequently the right one. The lower lobes are affected most often, next the apical lobes, while the middle lobe of the right lung very rarely suffers alone, though it is not uncommon for the entire lung to be attacked. The inflammatory process consists of three stages.

1. *Stage of Hyperemia or Congestion.*—The lung is dark-red in color, firmer than normal and less resilent. Its specific gravity is increased but it still floats in water. The air-cells are not collapsed, contain some epithelial and cellular debris, and are still inflatable. The capillaries are dilated and the alveolar epithelium swollen.

2. *Stage of Red Hepatization or Consolidation.*—The tissues have become firmer, more friable and darker, the air-cells can no longer be inflated and the lung sinks in water. The vessels are greatly dilated and the alveoli are completely filled with an exudate consisting of coagulated fibrin, red blood corpuscles and leukocytes and containing pneumococci and sometimes other germs. The presence of these plugs gives the cut surface of the lung a characteristic dry, granular appearance. The interlobular connective tissues are also infiltrated with leukocytes.

3. *Stage of Gray Hepatization.*—During this stage the exudate undergoes a granular and fatty change, becomes lighter in color, giving the cut surface of the lung a grayish color. The tissue becomes more moist, and softer, the exudate liquefies, is partially expectorated and partially absorbed by the blood and lymphatics. If there is infection with pus microbes the exudate becomes purulent and may infiltrate the tissues and cause

necrosis with the formation of an *abscess,* or more rarely *gangrene.* Once in a while there is an overgrowth of connective tissue following pneumonia, causing obliteration of the alveoli, or *induration.* There may also be tubercular infection during this period.

Resolution is the term applied to the stage of tissue recovery. It is really coincident with gray hepatization. The *crisis* occurs when liquefaction of the exudate commences.

Other organs of the body are more or less affected. The right heart is dilated and may show signs of degeneration. Pericarditis and endocarditis are not uncommon complications. Septic endocarditis may lead to meningitis. There is usually some congestion of the liver, spleen and kidneys. Pleural inflammation occurs in practically every case of pneumonia, the serous membrane overlying the diseased portion of the lung being affected.

The general conception of the pathogenesis of pneumonia is founded upon the belief that the disease is a pneumonitis—an inflammation of the lung. Dr. A. H. Smith, of New York, takes exception to this position. He states positively that the disease is *not* a pneumonitis. "Inflammation is a perverted nutrition, but in pneumonia the nutrition of the pulmonary parenchyma does not suffer. At the most there is only a certain amount of desquamation of the epithelium, the walls of the air-cells remaining intact and ready to resume their function the moment the exudate is removed from within the cell and stasis in the functional capillaries is relieved. There is nothing left that represents the effects of inflammation, no interstitial deposit, no obliteration of vessels, no loss of substance, no new formations." The nutritional circulation of the lung, he points out, is unimpaired, the exudate being derived from the functional blood supply. The pathologic process is one of "germ culture going on in a culture medium, which medium is supplied from vessels that do not participate in the nutrition of the part, but at the same time are susceptible to the action of the specific irritant furnished by the specific germ in question. Each air-cell thus becomes in effect a tiny test-tube in which a colony is growing, the exudate serving as a culture medium." He emphasizes the importance of two points; first, that the

system is infected by a toxin produced in the lung and, second, that the presence of the exudate causes respiratory embarrassment. These observations of Dr. Smith are of extreme importance and will be referred to later.

SYMPTOMS.—The length of the period of incubation of pneumonia is not known but it is probably short. The onset is usually sudden, though the patient may have complained of headache and malaise, or presented the symptoms of an ordinary "cold" for several days preceding. It is ushered in with a severe chill, often lasting half an hour or an hour, followed by a rapid rise of temperature, reaching its maximum (104° to 105° F.) within twenty-four hours. In children the chill may be replaced by convulsions.

The pulse is full, bounding, and its rate somewhat increased (100 to 120) but not proportionately with respiration, which is shallow and very rapid (30 to 80). The normal ratio between pulse and respiration is about 4 to 1; in pneumonia it is decreased to 3 to 1 or even 2 to 1. This is a characteristic symptom of the disease.

Pain in the side is one of the earliest symptoms. It is generally felt in the region of the nipple or axilla and is sharp, lancinating and increased by respiration. The pain is due to the coincident pleuritis and is often absent or slight in children. It increases the dyspnea, which is a prominent symptom. The patient's countenance has an anxious expression, the lips are cyanotic, there is a dark-red or "mahogany flush" of the middle of the cheek or cheeks and in one-third the cases there is a herpetic eruption ("cold-sores") about the mouth or nose. This is said to be a favorable sign.

A cough soon appears, at first dry and hacking, only a little viscid mucus being expectorated, though rarely this may be stained by arterial blood. In two or three days there is the characteristic pneumonic "rusty" sputum; it is frothy, tenacious and streaked with dark, grumous blood, giving it a brownish-red appearance. This symptom is also one of the characteristic features of pneumonia. In asthenic cases, especially in alcoholics, the hemorrhage is more profuse and the sputum is darker and more deeply stained, giving it a "prune-juice" color.

The tongue is heavily coated and may become dry and brown, there is often vomiting and the bowels are usually constipated. Delirium is common in the more severe cases, especially in children, in whom there may be symptoms suggestive of meningitis. The delirium is usually mild and muttering but in hard drinkers may be wild and maniacal. On the other hand, many very severe cases retain consciousness, even to the moment of death.

The urine is scanty and high colored. It may contain a small amount of albumin and is deficient in chlorids. There is moderate leukocytosis; rarely it may be very marked.

The disease runs an acute course, the fever remaining high, with daily remissions of about a degree until the fifth, seventh, ninth or eleventh day when it terminates suddenly by *crisis*. This usually occurs at night and within a few hours the temperature sinks to normal, the pulse-rate falls, dyspnea disappears and the patient falls into a quiet sleep. There may be profuse sweating and sometimes diarrhea. In other cases the temperature falls gradually, or by *lysis*. Occasionally there is a pseudo-crisis, in which the fever subsides several degrees but rapidly rises again; this is often significant of further extension of the disease.

The symptoms just described are those of the typical or *sthenic* form of pneumonia. In the *asthenic* form of the disease the symptoms are less marked; the chill may be slight; the temperature does not run high; dyspnea and pain are less severe; the pulse is rapid but thready and feeble; and prostration very marked. The asthenic type is more common in the aged and debilitated. More information is to be gained by the physical examination of the chest.

PHYSICAL SIGNS.—The accompanying table gives an outline of the physical signs:

	STAGE OF CONGESTION.	STAGE OF CONSOLIDATION.	STAGE OF RESOLUTION.
INSPECTION.	Movement of affected side restricted.	Movement of affected side absent or greatly decreased; that of well side increased.	Movement of the affected side gradually returns.

	Stage of Congestion.	Stage of Consolidation.	Stage of Resolution.
Palpation.	Slight increase of vocal fremitus.	Marked increase of vocal fremitus (unless there is associated pleurisy with effusion).	Vocal fremitus is diminishing.
Percussion.	Percussion sound usually higher pitched and even tympanitic (skodaic).	Percussion note at first tympanitic, becoming dull or flat; a sense of resistance to the pleximeter finger.	Dulness and tympany slowly but gradually disappear.
Auscultation.	Respiratory sounds are feeble, distant and bronchovesicular over affected area; beyond this area they may be exaggerated. There may be subcrepitant rales. Crepitant rales at end of inspiration; sometimes pleuritic friction sound.	Bronchial breathing usually present, absent if bronchi are plugged. Bronchophony usually present; occasionally pectoriloquy crepitant rales at beginning of stage; possible friction sound.	Moist rales heard over bronchi, both on inspiration and expiration. Crepitant rales may reappear. Bronchial breathing replaced by broncho-vesicular and normal.

Complications.—More or less bronchitis and pleuritis attends every case and may greatly increase the severity of the symptoms. If the pleurisy is the prominent feature of the disease it is known as pleuro-pneumonia. Empyema is a frequent sequel. When the fever subsides by lysis pleurisy with effusion is to be suspected. Pericarditis occasionally complicates left-sided pneumonia. Endocarditis is even more frequent and if septic may cause meningitis. Other less common complications are neuritis, parotitis, gastritis, colitis, peritonitis and nephritis.

Pneumonia is sometimes a complication of enteric fever; it is then known as typhoid pneumonia. The same name is applied to the disease when from any reason it assumes the typhoid type.

Diagnosis.—The diagnosis of pneumonia may usually be

made by the severe chill, high fever, pain in the side, "mahogany flush," rusty sputum and disturbed relation between pulse and respiration. In asthenic cases these symptoms may be absent or modified. The physical examination gives the only accurate information. The differential diagnosis between pneumonia and pleurisy has been given elsewhere (see Pleurisy).

The accompanying table shows the diagnostic differences between lobar pneumonia, bronchopneumonia and acute pneumonic phthisis:

Lobar Pneumonia.	Bronchopneumonia.	Acute Pneumonic Phthisis.
Onset sudden, with severe chill.	Onset gradual, following bronchitis, measles or pertussis; chill absent or slight.	Onset gradual, following exposure; recurring sense of chilliness.
Fever high and continuous; definite course ending in crisis after 5 to 11 days.	Fever moderate, irregular, ending in lysis often indefinite period.	Fever remittent, often becoming intermittent; no crisis; disease continuous until fatal termination.
Sweating slight or absent until crisis, then profuse.	Sweating absent or slight.	Sweating profuse, especially at remissions.
Pulse and respiration ratio greatly disturbed.	Pulse and respiration ratio normal or nearly so.	Pulse and respiration ratio normal or nearly so.
Mahogany flush.	Face pale.	Hectic flush toward evening.
Herpes present in one-third the cases.	No herpes.	No herpes.
Sputum tenacious and rusty-colored.	Catarrhal sputum.	Sputum may contain streaks of blood; more copious and often purulent.
Disease usually unilateral; base most frequently attacked.	Disease usually bilateral; usually diffuse areas.	Usually commences in one apex but rapidly extends to other side and base.
Physical signs of consolidation followed by resolution.	No consolidation; subcrepitant rales; broncho-vesicular breathing.	Physical signs of consolidation; cavities form.

PROGNOSIS.—The average mortality of pneumonia, according to Wells, is 18 per cent. It is greatly increased in young children and the aged. In the former under two years of age 50 per cent die. It is equally fatal in persons over sixty. It undoubtedly carries off more old people than any other disease. The prognosis is extremely grave in drunkards. "Prune-juice" expectoration, high fever, weakness, rapidity of the pulse and early delirium are bad symptoms. Double pneumonia is fatal in the majority of cases.

TREATMENT.—*Prophylaxis.*—With a knowledge of the infectious character of pneumonia much should be done to prevent its dissemination by adopting simple quarantine measures, by boiling linen and bed clothing, by disinfecting the sputa and fumigation of the sick-room after the patient's recovery. During the prevalence of the disease the avoidance of unnecessary exposure and the prompt treatment of all catarrhal conditions should be advised.

Hygienic and Dietetic.—The patient should be given a large, well-ventilated room, with an abundance of fresh air. The temperature should be kept at about 60° to 65° F. An excess of bed-clothing should be avoided, the friends being assured that there is little danger of "taking more cold." The diet should be entirely liquid, consisting of milk (which may be diluted with Vichy or peptonized if thought necessary), malted-milk, koumiss, egg-albumin, liquid peptonoids, light broths or beef tea. Farinaceous foods should be avoided since they may produce flatulence, which increases the dyspnea.

Specific Treatment.—By this we mean any method of treatment which is meant to attack the causes of the disease—the germs and their toxins. Many methods have been proposed for the purpose of aborting or jugulating pneumonia. Formerly much confidence was placed in venesection and it is still regarded with favor by some physicians. It is probable that better results would attend this procedure if it were followed by the subcutaneous use of hot saline solutions. By this means the amount of toxin in the blood would be decreased and diluted. It would also stimulate the action of the heart, increase elimination from the skin and kidneys without diminishing the amount of circulating fluid. The saline solution, without venesection, has been

used by Osler and others with apparently good results. Penrose has tried in connection with it, in some desperate cases, the inhalation of oxygen. To increase its efficiency the gas is passed through the following antiseptic solution:

Creosote (beechwood)	oz. ½
Oil turpentine	oz. ½
Comp. tinct. benzoin	oz. 2

The inhalations are given at intervals whenever lips or finger tips become bluish, are continued till the color is normal, usually from ten to fifteen minutes in those who give a good reaction.

Petresco has advocated the use of enormous doses of digitalis, two drams of the leaf being given in the form of infusion within twenty-four hours. This, he claims, will often cut short the disease or modify its subsequent course. He reports a very low death-rate but the method is fraught with such self-evident dangers that it is not likely to become popular in this country. The efficiency of the digitalis treatment is said to depend upon the increased flow of leukocytes through the lung.

The serum treatment which at first promised well has proven disappointing. It was first proposed by the Klemperer brothers who suggested the use of immunizing doses of pneumotoxin. Pane has prepared an antitoxin which has been used in this country, notably by Fanoni, with varying results. It is probable that the mixed bacteriologic character of pneumonic cases militates against uniform success with this serum. The work along this line is, however, hopeful.

We have alluded to the position of A. H. Smith concerning the pathogenesis of this disease. Therapeutically, the hypothesis seems to be promising. The use of large initial doses of calomel (20 to 30 grains) to abort the disease, the treatment with sodium salicylate, whose value was demonstrated by Liegel, and carbonate of creosote (creosotal) as advocated by Corgier and Cassoute, all derive their efficiency, he thinks, from their antiseptic action upon the specific bacteria. Sodium salicylate is given in 10 to 15 grain doses, the patient taking from one and one-half to two drams in twenty-four hours. Ammonium salicylate is often preferred to the sodium salt, since it is stimulating instead of depressing. Dr. Smith prefers creosotal. This

drug has the advantage of being eliminated largely by the breath and is more actively antiseptic. By its use it is claimed that the temperature falls, the entire course of the disease is shortened and some cases, if treatment is commenced early, may be actually aborted. Cassoute gives to adults 2½ drams in twenty-four hours, as follows:

Creosotal .....dr. 2½
Emulsion or syrup.....oz. 2
To be taken in four doses.

Or, if preferred, a teaspoonful may be taken night and morning in a cup of hot, sugared milk. The doses for children are proportionate. The quantity can be increased without danger.

Symptomatic Treatment.—At the beginning of an attack of pneumonia a full dose of calomel should be given, followed by a saline in order to completely unload the bowels. The skin and kidneys should be kept in good working order by the use of potassium citrate or acetate, ammonium acetate or sweet spirits of niter, if found necessary. These measures also help to equalize the circulation.

For the relief of pain local applications are useful. Mustard paste, hot flaxseed poultices, hot larded flannels, and "slap-jacks" (Waugh) are popular methods of applying heat. But cold in the form of compresses, ice-bags, etc., is to be preferred and has the advantage of also reducing the fever. It will be alluded to again. Many prefer the cotton jacket made to enclose the whole chest and covered with oiled silk. These applications probably exert no influence upon the course of the disease.

Venesection is undoubtedly a most effective remedy and may be tried during the earlier stages in robust, adult patients; if there is a full, bounding pulse, great embarrassment of respiration and severe pain. The relief of all these symptoms which sometimes follows the withdrawal of a pint or more of blood is often very great. The popular opposition to "bleeding" is difficult to surmount but in cases of extreme dyspnea, occurring at this stage, the physician should nevertheless be prepared to undertake it. In lieu of venesection leeches or wet cups may be applied. Dry cups must be repeated but often afford marked relief. Combinations of silicated earth and glycerin of the

"antiphlogistine" class applied to the chest hot, in the form of a paste, are said to produce good results.

In many cases it is necessary to resort to the use of opium or morphin. For internal administration five grains of Dover's powder or one-half grain codein may be given. The best results are of course obtained by the use of morphin ($\frac{1}{8}$ to $\frac{1}{2}$ grain) hypodermically. Opium has the additional advantage of relieving the cough, one of the most troublesome symptoms. Heroin ($^1/_{12}$ grain) and codein ($\frac{1}{4}$ to $\frac{1}{2}$ grain) are especially suited for this purpose. The latter may be combined with other indicated drugs, as in the following:

Codein sulphate .....gr. 8
Potassium citrate .....dr. 5
Spts. chloroform .....dr. $2\frac{1}{2}$
Syrup orange, enough to make.....oz. 4
Teaspoonful every two to four hours.

The arterial sedatives, veratrum viride and aconite, were formerly held in high esteem when the pulse was tense and full. Their use was supposed to relieve the pulmonary hyperemia of the earlier stages of the disease by "bleeding the patient into his veins." Their depressing effect and the fact that they prevent rapid oxygenation of the blood has led to their general condemnation. Much faith is, however, still felt in their efficiency by many physicians. Veratrum is the safer of the two remedies and is usually given in 1 to 5 minim doses every one-half to two hours until the characteristic sedation of the pulse is produced. The alkaloidal school, led by W. F. Waugh, advocates a combination of aconitin (grain $^1/_{134}$), veratrin (grain $^1/_{134}$) and digitalin (grain $^1/_{67}$), to be given together every one-half to two hours. In asthenic conditions strychnin arsenate (grain $^1/_{134}$) is substituted for the veratrin. It is claimed that the aconitin and veratrin relax the venous system while the digitalis strengthens the heart. This combination would seem to be a physiological paradox.

To reduce the temperature the best results are obtained, in suitable cases, by the local application of cold. The "nervous," the aged, and young children, however, often do better with heat. Baruch recommends the thoracic compress, applied as follows: "So long as the thermometer registers over 100°, a compress made of three folds of old coarse linen wrung out of water at

60° F. is wrapped around the chest from the clavicle to the umbilicus. It should be long enough to lap over one inch in front, and so slit in its axillary portion that it may rise easily up to the clavicle without leaving rough folds in the axilla. This compress is smoothly wrapped around the chest and covered by one larger of thin flannel, an inch wider and longer.

"By changes in the preparation of the compress we may modify positively the effects aimed at. If, for instance, the body temperature is not very high, say from 100° to 102°, the compress may be more thoroughly wrung out, so as to make the impression of cold more brief, reaction more rapid and less enduring. If the temperature be high, 103° or above, the water temperature may be raised to 65°, more water may be allowed to remain in the compress, thus rendering the reaction more slow and enduring and abstracting more heat. In the first instance the application will be more stimulating, in the latter more soothing and antipyretic. If the patient is easily chilled or does not react readily, whether the body temperature be moderate or very high, the compress may be allowed to remain longer without change; its repetition may vary from half an hour to an hour, or even longer, according to the patient's condition, his reaction and other effects produced and aimed at."

Mays employs a similar method, using ice-bags instead of compresses. Cold should also be applied to the head. A simpler method and one nearly as efficient is cold sponging. This can be used with comfort when the temperature is high, upon the most sensitive. It is claimed that the application of cold "reduces fever, allays the irritability of the nervous system, diminishes respiratory and cardiac frequency, quiets cough, alleviates difficult breathing, tones up the function of the heart, strengthens the pulse, abates pain in the chest, provokes sleep and gives general comfort to the patient." It is also claimed that it will check the extension of the inflammatory process. While it may not do all the things which its enthusiastic advocates expect of it, the method of treatment is certainly one of the most valuable in our possession.

Quinin is often given to reduce the temperature; it can hardly be said to be effective and it is used rather on empirical grounds. It is, however, a valuable tonic.

ing foreign substances, such as sputa, blood-clots, particles of food, etc., into the bronchi through the larynx. The bacteriology of the disease is probably similar to that of pneumonia. The pneumococcus, streptococcus, staphylococcus, diphtheria bacillus, influenza bacillus and tubercle bacillus have been found and may be exciting causes.

PATHOLOGY.—Both lungs are usually affected. Instead of attacking a whole lobe, as in croupous pneumonia, the disease is confined to a number of patches scattered throughout the lung. Upon close examination, these diseased patches are found to consist of inflamed and thickened bronchioles, each one surrounded by a small pea-sized nodule of consolidated tissue. The air-cells and bronchioles are filled with an inflammatory exudate consisting of broken-down epithelial cells, leukocytes and a few red corpuscles; this exudate soon degenerates and becomes purulent. The bronchioles and terminal bronchi are the primary seat of the inflammation. The affected lobules often coalesce and form considerable areas of consolidation. Surrounding these are areas of collapsed lung (*atelectasis*) due to occlusion of the bronchi. Between the diseased patches, the lung is slightly affected; it is usually somewhat congested and often edematous. The pleura is often covered in places with a slight fibrinous exudate.

SYMPTOMS.—The disease may commence abruptly with a chill or chilliness, fever of irregular type (101° to 103° F.), a sense of oppression in the chest, cough and the expectoration of viscid mucus which soon becomes muco-purulent. Or it may be more gradual in its onset, associated with malaise, presenting at first the symptoms of an ordinary attack of bronchitis.

Usually it is secondary to measles, pertussis or some other infective process. In these cases it is likely to develop during convalescence, the early symptoms being those of bronchitis. The temperature soon becomes high (104° to 105° F.), there is great dyspnea, the face and lips become pale and cyanotic, the respiratory rate is greatly increased (40 to 60), there may be night-sweats, the pulse is feeble and very rapid (140 to 160), and there is a troublesome cough and the raising of muco-purulent matter (rarely blood-stained), except in very young children who do not expectorate but often swallow the sputa

and eject it by vomiting. These symptoms produce great distress and profound prostration, the patient often passing from a stage of restlessness into a semi-comatose condition ending in death.

In adults, especially of advanced age, these symptoms are often greatly modified. The fever may not run high; there may be little cough, but the pulse is rapid and weak, cyanosis is marked and prostration very great.

The duration is variable. It may cause death in a few days. In the most favorable cases the process is terminated in one to three weeks; in others it may last as many months. Tuberculosis is a very frequent and much-dreaded sequel. Abscess or gangrene of the lung also rarely follows it.

Physical Signs.—On account of the small size of the pulmonary lesions and their scattered location it is often difficult to make out the consolidated areas, especially in young children.

Inspection.—Difficult and rapid respiration; retraction of the cartilages of the ribs and lower sternum during inspiration; pallor of the face, with cyanosis, followed by lividity and blueness of the finger-tips.

Palpation.—Sometimes small areas of increased vocal fremitus can be made out. Often no information is obtained by palpation.

Percussion.—Circumscribed areas of consolidation in both lungs may be detected.

Auscultation.—Over the consolidated areas there is bronchial or broncho-vesicular breathing and subcrepitant rales. Over the balance of the chest there are often moist rales due to attendant bronchitis.

Diagnosis.—For the differential diagnosis from croupous pneumonia and acute pneumonic phthisis, see Pneumonia, Lobar.

Prognosis.—In young children the death rate from broncho-pneumonia is very high—30 to 60 per cent. It is also a source of great danger to the aged and as serious as croupous pneumonia in middle-aged adults. When it follows the infectious diseases the prognosis is often favorable. Aspiration pneumonia is nearly always fatal.

Treatment.—*Hygienic and Dietetic.*—The sick-room should be a well-ventilated apartment, kept at an even temperature

(about 70° F.) and the air moistened with steam from the evaporation of water over a stove or alcohol lamp. The addition of antiseptics, such as creosote, turpentine and eucalyptol, adds to the value of this procedure. The food must be liquid. Milk, which may be peptonized or diluted with Vichy, if preferred, malted milk, liquid peptonoids and nutritious broths and gruels are suitable articles of diet.

Local Treatment.—In patients suffering from bronchopneumonia hot applications are usually to be preferred to cold—unless the temperature runs high. The linseed poultice or the poultice-jacket is most in favor. This should be light, covered with oiled-silk, and changed with sufficient frequency to retain the heat of the part. The addition of a little mustard (1 part to 16—Cheney) adds to its counter-irritant effect. If preferred a mustard draft may be applied. In children this should be very weak (1 part mustard to 6 or 7 of flour) and should never be allowed to blister. In mild cases rubbing with warm camphorated oil, then covering the chest with dry, hot flannels, gives comfort to the patient. Turpentine is another useful local application. It should be mixed with olive or cotton-seed oil in the proportion of 25 to 50 per cent. It is rubbed in like the camphorated oil. The principal value of these measures is for the relief of pain. Some prefer the simple cotton or wool jacket.

Cold is less useful than in lobar pneumonia, but in high temperature may be used with decidedly beneficial results. Cold sponging, the cold pack and the bath are the methods in vogue.

Local applications of cold to the chest, as recommended for lobar pneumonia, are useful in robust patients and are believed by Mays, Baruch and others to limit the inflammatory process. Cold compresses and ice-bags are used (see Pneumonia, croupous).

General Treatment.—There is no specific, although the creosotal method of treatment advocated by Cassoute and Corgier is highly recommended for its antiseptic effect. Hodghead has recently (Archives of Pediatrics) praised the action of belladonna in this disease; he gives two drops of the tincture to a child every hour or two or until the desired results are produced. He reports thirty cases, with only two deaths. He

attributes his good results to the fact that the drug is a cardiac and respiratory stimulant and prevents excessive secretion. It is particularly valuable in the later stages of the disease, but cannot, however, be considered a specific.

At the beginning of treatment the patient should be given calomel in divided doses ($\frac{1}{4}$ to 1 grain every hour) until the bowels act thoroughly. In the early stage, if the pulse is full and bounding, small doses of aconite or veratrum may be given, but these should never be pushed and may generally be avoided. If the temperature is not sufficiently reduced by cold bathing a simple febrifuge and diaphoretic may be given, as follows:

Potassium citrate	dr. 4
Spts. nitrous ether	oz. 1
Arom. sp. ammonia	dr. 4
Syrup lemon	oz. 1
Sol. ammon. acetate, enough to make	oz. 4

Dessertspoonful in water every two to three hours for adults. Children in proportion.

The coal-tar antipyretics are to be avoided.

Cough, if very troublesome, calls for small doses of an opiate. Paregoric is as satisfactory as anything for children, and codein ($\frac{1}{8}$ to $\frac{1}{4}$ grain) and heroin ($^1/_{12}$ grain) for adults. During the later stages of the disease the secretion of mucus often becomes tenacious, is scanty and is raised with difficulty. For this condition stimulating expectorants are required, such as ammonium carbonate or chlorid, or aromatic spirits of ammonia. The last is a less powerful expectorant but is tolerated better by the stomach. The carbonate is the most active cardiac stimulant; the chlorid promotes the freest expectoration. A prescription recommended by Solis-Cohen follows:

Ammonium chlorid	dr. 2
Ammonium carbonate	gr. 12
Fluid ext. coca	oz. $1\frac{1}{2}$
Spts. nitrous ether	dr. 4
Essence pepsin	oz. $1\frac{1}{2}$
Sol. ammon. acetate, enough to make	oz. 6

Tablespoonful every two to three hours.

Goodhart and Starr recommend for a child of two or three years—

Ammonium carbonate	gr. 24
Syrup tolu	dr. 6
Brandy	dr. 3
Syr. senega	dr. 3½
Syr. acacia, enough to make	oz. 3

Teaspoonful every two hours.

An excessive secretion of mucus, which sometimes occurs in the later stages of the disease, may accumulate in the bronchi and being raised with difficulty is often a serious menace to life. This is especially true in infants who do not expectorate. In such cases it may occasionally be expedient to administer an emetic, as alum (1 teaspoonful), turpeth mineral (2 to 5 grains) or syrup of ipecac (1 dram) in order to cause vomiting that will expel the accumulated mucus. It is in these cases that belladonna is especially useful.

Stimulants are nearly always required in bronchopneumonia. Some clinicians make it a rule to give alcohol or whiskey from the beginning. It seems wiser to await the signs of weakening of the right heart. Strychnin is the most valuable stimulant drug and is especially useful in the aged and feeble. It should be given in good-sized doses ($^1/_{60}$ to $^1/_{15}$ grain for an adult) throughout the disease. In association with atropin it is the most useful in the cases of excessive secretion, associated with weakness of the heart, cyanosis and great prostration. Digitalis may also be required in these cases if the heart muscle shows signs of exhaustion. To tide the patient over an emergency the more diffusible stimulants, such as aromatic spirits of ammonia, ether and camphor, may be employed. The latter in the form of camphorated oil may be given hypodermically, a syringe full every half-hour. Jacobi recommends the tincture of musk (see Influenza).

If the patient becomes cyanotic or there is marked dyspnea, inhalations of oxygen are indicated. Extreme nervousness and insomnia are often relieved by the cold bath or sponging; or the warm bath may be preferred if the temperature is low or the patient is sensitive to cold. Sodium bromid in suitable doses is quieting. This may be combined with the expectorant mixture or given alone. Sometimes small doses of chloral or trional will be required, or 5 to 10 grains of asafetida may be given in suppository.

Special care should be given the patient during convalescence, remembering the tendency to tubercular complications. If the lung clears up slowly the chest may be painted with iodin and potassium iodid administered internally. Cod-liver oil, hypophosphites, maltine and iron, arsenic, strychnin and other tonics should be given if the patient needs building up. Gentle exercise, hydrotherapy, regulated diet, massage and change of climate are desirable in some cases.

POLIOMYELITIS, ANTERIOR; INFANTILE PARALYSIS.

DEFINITION.—An acute febrile disease, usually occurring in young children and producing muscular paralysis and atrophy.

ETIOLOGY.—It usually occurs before the third year of life, rarely in adults. The disease is more frequent in summer than in winter. The exciting cause is often believed by the child's parents to be some injury, taking cold or teething, but these probably have no influence upon its production. It sometimes occurs in epidemics and there is strong presumptive evidence of its infectious character.

PATHOLOGY.—There is degeneration of the nerve cells in the anterior or motor portion of the spinal cord, the cervical and lumbar regions being most frequently attacked. The morbid process probably originates in the blood-vessels, which become choked, finally shutting off the nutrition of the tissues. The degenerated nerve cells are atrophied or entirely replaced by the overgrowth of connective tissue, which causes sclerosis and contraction of one side of the cord. The muscles receiving their nerve supply from this point undergo fatty degeneration and fibrous changes, thereby producing permanent atrophy.

SYMPTOMS.—The onset of the disease is usually sudden, although in some cases, for a day or two before its appearance, the child is fretful and feverish. In most cases it commences with fever (101° to 105° F.), headache, pains in the joints and limbs, sometimes vomiting and drowsiness. During this stage the child's indisposition may be so slight as to hardly attract attention. In severe cases there may be convulsions or unconsciousness. Within a day or two, sometimes within a few hours, paralysis ensues. One or both legs, one or both arms

and sometimes a leg and an arm are affected; in the majority of cases only one limb suffers. The paralyzed member remains unchanged for a week or two, then gradual improvement commences. Motion is restored to some groups of muscles, commencing in those last paralyzed; rarely the entire limb recovers. Usually there remains a permanent paralysis of greater or less extent. Meanwhile the muscles begin to atrophy, giving the electrical reaction of degeneration, and the affected limb thereafter grows less rapidly than that of the opposite side, soon becoming shorter, and remains permanently shrunken. Contractures of the muscles may cause club-foot or other deformities.

DIAGNOSIS.—There is seldom any difficulty in diagnosis. The fever, the sudden appearance of paralysis and the rapidly ensuing flaccidity and wasting of the limb, giving the reaction of degeneration, are distinctive.

The pseudo-paralysis of rickets is due to the pain on attempted motion and is accompanied by the characteristic signs and symptoms of that disease. Scurvy, myelitis, hip-joint disease, etc., can hardly be mistaken for it if the symptoms are carefully observed.

PROGNOSIS.—The disease seldom, if ever, causes death, but more or less permanent paralysis and deformity almost invariably follows. The general health is not affected.

TREATMENT.—Unfortunately the real nature of the disease is not recognized in most cases until paralysis has occurred. If a febrile ailment is suspected to be poliomyelitis, active measures should be taken to modify its course. The bowels should be unloaded with calomel, given in small repeated doses. If there is irritability of the stomach, enemata should be administered to remove any fecal accumulation and the patient kept quiet in bed. Fever may be reduced by cold bathing and by small doses of phenacetin or acetanilid. An ice-bag should be placed upon the spine, counter-irritation made with dry cups, or leeches applied over the suspected area.

During the first two or three weeks the patient should be kept quiet in bed, in order to give the system every opportunity for the absorption of inflammatory exudate. The limb should be kept warm by wrapping it in flannels and applying artificial

heat. After a few weeks, the active symptoms having meanwhile subsided, treatment may be undertaken looking to a limitation of the atrophy. Electricity is the most generally useful. Galvanism may be tried with the hope of stimulating the nerve centers, the positive pole being applied over the affected portion of the cord and the negative pole to the limbs, about five milliamperes being allowed to pass for five minutes twice daily. Electricity is of most value in stimulating the atrophied muscles. For this purpose either galvanism or faradism may be used. The latter is the more useful when it excites muscular contraction. Collins recommends the faradic bath. In using electricity, very mild currents should be tried first, the strength being gradually increased so as not to alarm the child. As adjuvants to the electrical treatment, massage, Swedish movements, hydrotherapy and, later, suitable exercises should be regularly and systematically employed. The limb should be kept uniformly warm. Strychnin has some reputation for restoring the function of the muscles and should be tried. Tonic and nutrient drugs should be given when indicated.

"PRICKLY-HEAT"—*See* Miliaria.

PRURITUS.

DEFINITION.—Itching of the skin without a demonstrable, causative lesion.

ETIOLOGY.—Pruritus may be either localized or general. In the first case it is due to local irritation, as that produced by atmospheric cold, hemorrhoids, fistula and fissure, intestinal parasites, or contact with irritating discharges—vesical, urethral or vaginal; in the second case it is consequent upon some general cause, such as rheumatism, uricemia, diabetes, Bright's disease, old age, pregnancy, jaundice, articles of diet which cause gastric or intestinal derangement, constipation, nervous disorders, etc.

SYMPTOMS.—Itching is the sole symptom. If this is severe the skin may be torn and fissured by the finger-nails. Upon the lesions caused in this way an eczematous eruption may be implanted.

The itching may be general (pruritus universalis), but more

frequently it is localized; the genital and anal regions are peculiarly prone to suffer on account of their constant contact with irritating discharges. Pruritus of the vulva or of the prepuce is often caused by the passage of diabetic urine. Hemorrhoids, fissure or fistula of the anus may be a cause of pruritus ani. Dunn (Jour. Am. Med. Ass.) calls attention to the frequent occurrence of a small superficial ulcer between the internal and external anal sphincters, on the posterior surface. **Pruritus is most common in advanced life (pruritus senilis)** and in winter (pruritus hiemalis).

PROGNOSIS.—Depends much upon the cause. If this can be removed a cure can be predicted.

TREATMENT.—*General Treatment.*—The success attending treatment will depend upon the accuracy of the diagnosis—the recognition of the underlying cause. The possibility of some complicating disease should always be considered. In every case the urine should be examined. If sugar is found a proper hygienic and dietetic regime should be instituted; if there are albumin and casts the treatment should be appropriate to the form of nephritis present.

Many patients who suffer from generalized pruritus are undoubtedly of the lithemic or rheumatic diathesis; in these patients, especially, indiscretions of diet are likely to bring on attacks of itching. The diet should therefore be restricted —rich, carbohydrate food which tends to intestinal fermentation, an excess of lean meats, alcoholic beverages, tea, coffee, etc., being forbidden or reduced in quantity. Patients should be encouraged to drink plenty of water, to take sufficient exercise, to avoid irritation of the skin, to keep the bowels carefully regulated and take frequent hot or vapor baths to promote elimination from the skin. The alkaline diuretics and sodium salicylate are the drugs usually recommended. Digestive disorders require treatment appropriate to this form.

In case there is a condition of nervous irritation, sedatives may be required. The following is recommended in the Journal des Practiciens:

Ammonium valerianate	gr. 30
Tinct. valerian	dr. 2
Peppermint water	oz. 3

Two teaspoonfuls in infusion of chamomile flower three times a day.

In old and debilitated patients the following may be useful:

Strychnin sulphate	gr. 1
Ext. Cannabis Ind	gr. 3
Quinin hydrochlorate	gr. 24

Make 24 pills. One pill after each meal.—Thornton.

If the skin is dry and harsh pilocarpin ($^1/_{10}$ grain twice a day) has been recommended. It should be used cautiously and should be avoided if there is much debility. Carbolic acid (½ to 1 grain) has also been given internally, and cod-liver oil is said to favorably modify the condition in some cases.

Local Treatment.—Hot baths often add decidedly to the patient's comfort. Their effect is increased by adding alkalies, as sodium carbonate or bicarbonate or borax to the water or by the use of almond-meal, bran or starch in the bath. These are also used in lotions which are applied to the skin. Vinegar, diluted, is a favorite application.

When a large area of skin is affected lotions are generally to be preferred. Carbolic acid is the most satisfactory drug for this form of administration in the majority of cases. It should be used in a strength of 1 to 2 per cent. The addition of a little glycerin to the water increases its solubility, as in the following:

Carbolic acid	gr. 30
Glycerin	dr. 1
Water	oz. 6

Chloral is also valuable in many cases, as in the following:

Chloral hydrate	dr. 1
Glycerin	dr. 6
Alcohol	dr. 6
Water	oz. 6

Other drugs much used in the form of lotions are thymol (½ dram to the pint of water and alcohol), resorcin (1 to 4 drams to the pint) and weak tar lotions.

Ointments are a favorite method for the application of drugs if the pruritus is localized, as in pruritus ani or vulvæ, or if the skin is dry. Carbolic acid is also the favorite here (5 to 30 grains to the ounce), and thymol (3 to 20 grains to the ounce), chloroform (10 to 30 minims to the ounce), menthol (2 to 10

grains to the ounce), cocain (10 to 15 grains to the ounce) and ichthyol (10 to 25 per cent) are among the other drugs used. The last mentioned drug comes next to carbolic acid in value. The following formulas are recommended:

Menthol ..... gr. 15
Carbolic acid ..... gr. 15
Zinc oxid ..... dr. 2
Vaselin ..... oz. 3
—Journal des Practiciens.

Resorcin ..... gr. 10
Ichthyol ..... dr. 2
Benzoic acid ..... dr. 1
Rose ointment, enough to make ..... oz. 1
—Thornton.

Ichthyol ..... dr. 2—3
Powd. calamin ..... dr. 2
Vaselin, to make ..... oz. 1
Cocain ..... gr. 15
Conium ointment ..... oz. 1

In pruritus vulvæ astringent vaginal injections in addition to the sedative applications already prescribed are sometimes curative.

The existence of an essential pruritus ani is to be doubted; the condition is probably dependent in most cases upon some rectal disease. Constipation and hemorrhoids are usually responsible for the condition, though Dunn found minute ulcers between the external and internal sphincters and cured them by applications of pure lactic acid, first anesthetizing the part with cocain.

Lewis Adler (Phila. Med. Jour.) treats the hemorrhoidal condition with a daily injection of 1 to 2½ drams of the following, to be retained:

Fl. ext. hamamelis ..... oz. 1
Fl. ext. ergot ..... oz. 2
Fl. ext. hydrastis ..... oz. 2
Co. tinct. benzoin ..... oz. 2
Carbolized olive oil (5 per cent) ..... oz. 1

He then paints the hard, dry skin surrounding the anal margin with a saturated solution of silver nitrate, touching abrasions with 2 per cent cocain. This application is repeated two or three times, not oftener than every third day. Citrine oint-

ment is applied daily and kept in place with a wad of absorbent cotton and a T-bandage. Itching at night is relieved by hot water, followed by black wash or a calomel ointment. Rubbing is forbidden. He has cured all his cases, though treatment for six months may be necessary.

J. P. Tuttle relies principally upon the following:

Carbolic acid	dr. ½—1½
Salicylic acid	gr. 10—50
Boric acid	gr. 20
Glycerin or cold cream	oz. 1

In some cases the actual cautery, curetting or dissecting away the diseased areas have been resorted to.

PSEUDOLEUKEMIA—*See* Lymphadenoma.

PSORIASIS.

DEFINITION.—A chronic inflammatory disease of the skin characterized by the appearance of dry, shiny, silvery scales upon a reddened base.

ETIOLOGY.—It occurs most frequently in young adults (between 15 and 30), is often hereditary and individuals of the gouty or uric acid diathesis are especially susceptible. According to Bulkley the disease is aggravated by free indulgence in meats. Predisposing causes are pregnancy and lactation; it sometimes follows scarlet fever. Some authorities consider it identical with the dry form of seborrheic dermatitis. It is not contagious.

PATHOLOGY.—There is hypertrophy and thickening of the upper layers of the skin, increased prominence of the papillæ which reach more nearly to the surface and vascular dilation and cellular infiltration.

SYMPTOMS.—The eruption of psoriasis commences with the appearance of a number of elevated, reddened points, which are soon surmounted by shiny, white or silvery-colored scales; these are readily removed, exposing a raw, hyperemic surface. The eruption is always dry. The disease may not proceed beyond this stage, especially when it occurs in children; this form is

known as *psoriasis punctata.* In most cases, however, the lesions continue to increase in size. If they become drop-like in appearance the condition is known as *psoriasis guttata;* if they reach the size of coins it is called *psoriasis nummularis.* The latter is the most frequent variety. These are circular lesions, surrounded by healthy skin, and covered by the characteristic dry, silvery scales. While they increase in size at the periphery they show a tendency to heal in the center, producing ring-shaped lesions (*psoriasis circinata*). These often coalesce, thus producing irregular circular or spiral outlines (*psoriasis gyrata*).

The eruption is most frequent and most pronounced over the extensor surfaces, especially at the elbow and knee, but any or all portions of the body may be affected, though the face is rarely attacked. Its occurrence on the scalp is quite common, the lesions in this locality being small, multiple and separated by healthy skin, and often invading the adjacent non-hairy surfaces of the forehead and neck.

The subjective and constitutional symptoms are not marked. Itching is usually slight and may even be absent. The general health continues good. The eruption is worst during the winter months; during the summer it improves.

DIAGNOSIS.—Seborrhea of the scalp may sometimes be mistaken for psoriasis, but presents a more uniform distribution, lacks the inflammatory base and the scales are greasy and yellow.

Eczema is likely to attack flexor surfaces, fades gradually into the surrounding skin, is attended with marked itching, at some stage is moist and the scales are yellow and lack the white, glistening appearance of psoriasis.

Syphilis usually gives a distinctive history with other symptoms pointing to its nature. The eruption is of a mahogany-red as compared with the pink shade of psoriasis, the lesions are uniform in size and are more common on the trunk. Itching is absent, and the scales are yellowish and situated on a hard, resistant, elevated papule.

PROGNOSIS.—The disease is essentially a chronic one and may persist for months or years. Under suitable treatment the eruption often yields quite readily, but relapses are likely to occur.

TREATMENT.—*General Treatment.*—In individuals of the gouty diathesis the diet should be restricted. Meats, meat extracts, sweets, tea, coffee, tobacco and alcohol should be avoided and the patient encouraged to partake freely of milk, fresh fruits and vegetables, to drink plenty of water, particularly the alkaline mineral waters, and to take sufficient exercise. On the other hand, if the patient is poorly nourished a more generous diet is indicated, including an abundance of good lean meat. Cod-liver oil, iron, phosphorus and the bitter tonics may aid in the maintenance of nutrition. The bowels and digestive tract should be kept in good condition. Residence in a warm climate is desirable.

The drug which is without doubt the most valuable for internal use in the treatment of psoriasis is arsenic. But it should be used only in properly selected cases. It is of most value in the stationary forms of the disease. In children, when the lesions are in a transitional stage (as psoriasis punctata or guttata) it is far less valuable. It should never be taken when the eruption manifests active inflammatory symptoms. The drug is usually given in the form of Fowler's solution, in three-drop doses, three times a day after meals, gradually increased as tolerance is acquired. Large doses are seldom required, but the drug must be continued for a long time; but do not discolor the skin with it. The Asiatic pill is a favorite mode of administering arsenic and sometimes proves beneficial when other methods fail. Its formula, as modified by Duhring, is as follows:

Arsenous acid	gr. 2
Black pepper	gr. 32
Licorice powder	gr. 32

Make 32 pills. One pill three times a day, gradually increased.

In patients of the rheumatic or gouty type sodium salicylate is peculiarly valuable and is said to be beneficial in cases which do not improve under the use of arsenic. The alkalies are also prescribed in these cases. Liquor potassæ may be given in 10 to 15 minim doses in water, or potassium acetate or citrate in 20 to 30 grain doses. Robinson recommends—

Potassium acetate .....oz. 1
Spts. nitrous ether.....oz. ½
Wine colchicum .....dr. 2
Syrup orange .....oz. 1½
Dessertspoonful in water three times daily.

Potassium iodid is another drug sometimes used, but according to Walker it must be given in much larger doses than ordinarily recommended (as much as a dram to a dram and a half three times a day). Copaiba, turpentine, cantharides, tar, ichthyol and thyroid are among the other drugs recommended.

Local Treatment.—Before making topical applications to the affected part it is essential to remove the scales. This is usually readily done by daily bathing in warm water made alkaline by the addition of soda. The skin should be thoroughly macerated and then well dried. In severe cases prolonged immersion is sometimes advised. Hyde suggests soaking the scales in oil before washing. They may be removed from the scalp, or from other portions of the body if necessary, by shampooing with tincture of green soap.

Chrysarobin is the favorite remedy for external use. It, however, has the disadvantage of staining the skin and everything with which it comes in contact. It should not be used upon the face on account of the erythema which it produces and the danger of causing conjunctivitis. It is usually used in the form of an ointment (10 to 12 per cent), made with petrolatum or lanolin. This should be thoroughly rubbed in once or twice daily, commencing with the weaker strength and applying it at first to a small area. The part should then be protected with a bandage. Chrysarobin may also be made into a paste with water, as suggested by Fox, applied to the patch and when dry covered with a coat of collodion in order to make an impervious dressing. After a few days this comes off and the application may be repeated. A 5 per cent solution in liquid gutta percha may be painted on, or the following as recommended by Stelwagon:

Chrysarobin .....dr. 1
Salicylic acid .....gr. 10—20
Castor oil .....dr. 1
Collodion, enough to make.....oz. 1

The effect of the chrysarobin is to set up a dermatitis; the applications should be continued until the whitish areas of diseased tissue show inflammatory reaction similar to the surrounding healthy skin.

Salicylic and pyrogallic acids and tar are remedies of recognized worth in the treatment of psoriasis. Their modus operandi is similar to that of chrysarobin—i. e., they act as cutaneous irritants or stimulants, but they are less rapid in their action and as a rule less certain. They are usually applied in ointments—salicylic acid 3 to 6 per cent, pyrogallic 4 to 12 per cent, and tar ointment in about the same strength. Oil of cade and oil of birch are other tarry applications which may be substituted. Pyrogallic acid is next in value to chrysarobin, but also produces discoloration of the skin, though in a less degree than chrysarobin. Sulphur, ichthyol, resorcin, white precipitate and beta-naphthol are other useful drugs. Below are given a number of combinations:

Chrysarobin .....gr. 20
Oil cade .....dr ½
Zinc oxid ointment.....oz. 1
—Shoemaker.

Unna's compound chrysarobin ointment contains—

Chrysarobin .....gr. 80
Ichthyol .....gr. 48
Salicylic acid .....dr. ½
Vaselin .....oz. 1

For use upon the face and scalp he recommends the following, which will not produce irritation or discoloration:

Salicylic acid .....gr. 46
Pyrogallic acid .....gr. 46
Ichthyol .....dr. 2½
Olive oil .....dr. 2½
Lanolin .....oz. 4

A formula containing ammoniated mercury—

Ammoniated mercury .....gr. 10—30
Vaselin .....oz. 1

PUERPERAL CONVULSIONS—See Eclampsia.

PUERPERAL FEVER—See Septiemia and Pyemia.

PULMONARY HEMORRHAGE—See Hemoptysis.

QUINSY—See Tonsillitis.

RACHITIS; RICKETS.

DEFINITION.—A nutritive disease affecting young children and characterized by defective development and peculiar deformities of the bones.

ETIOLOGY.—Rickets may be congenital, but in the great majority of cases commences during the nursing period of the infant's life, but seldom before the sixth month. It occurs more frequently in Europe than in the United States, but is probably much more common in this country, especially in the large cities, than is generally thought to be the case. J. L. Morse (Boston Med. and Surg. Jour.) in 400 consecutive dispensary cases found signs of the disease in 80 per cent, practically the same as reported in Vienna. Negroes and Italians are peculiarly susceptible and the poor are the worst sufferers. Cold and damp, unhygienic surroundings and poor food are the most important factors in the production of the disease. The character of the food seems to have the most influence. While rickets may occur in a breast-fed infant, it is most frequent in bottle-fed children. Any cause which weakens the mother's health and affects the quality of her milk may cause the disease in her nursing child. It is probably not hereditary, though some authors have tried to find a relationship between it and syphilis. Both sexes are equally affected.

PATHOLOGY.—The morbid changes are most manifest in the bones of the skull, the long bones of the extremities and the ribs. In the skull there is prominence of the parietal and frontal eminences, persistence of the fontanels, the sutures are enlarged and there are often patches of thin and softened bone which yields to the pressure of the finger (*craniotabes*). The cartilage at the junction of the shaft and epiphysis in the long bones is thickened and the end of the bone enlarged and

swollen. There is rapid proliferation of the cartilage cells and delayed ossification. The periosteum is thickened, vascular, easily detached and underlaid with spongy tissue. In the ribs this swelling of the costal cartilages at their junction with the bony portion gives a peculiar beaded appearance, called the "rosary." The quantity of lime salts in the bones is reduced one-half, making them soft and pliable and predisposing to deformities of the legs, arms, thorax and pelvis.

SYMPTOMS.—The earlier symptoms of rickets include loss of weight, anemia and often slight feverishness. The digestion is impaired; there is usually flatulence, sometimes with great distention and prominence of the abdomen; there may be diarrhea or constipation. Quite an important early symptom is the tenderness of the bones and muscles; the child dislikes to be touched or lifted. Rachitic children are likely to be nervous, excitable, sleep poorly at night and show a decided tendency to convulsions. Dentition is delayed and the teeth which do appear decay quickly, since their enamel is defective. The child is also slow in getting the use of its limbs, sometimes not learning to walk until after two years of age. This is due in part to muscular weakness; in severe cases the indisposition to use the limbs may be quite naturally attributed to paralysis. This weakness of the muscles makes the child slow about holding up its head and predisposes to temporary curvature of the spine. A common symptom and quite a characteristic one is the tendency to excessive perspiration of the head and neck. The hair is usually thin, especially at the back of the head, where it is worn off by rubbing against the pillow.

The osseous changes produce some signs which are diagnostic. The prominence of the parietal and frontal eminences gives the head a characteristic square, angular, box-like appearance. It is usually flattened on top and the face looks unusually small when compared with the prominent forehead. The sutures are spread apart and the fontanels remain open, often until the child is five or six years old. The softened areas, craniotabes, may sometimes be felt.

The string of bead-like prominences, "the rosary," at the junction of ribs and costal cartilages is pathognomonic and to be seen or felt in nearly every case. The chest may be flattened

on the sides, making the sternum prominent ("chicken-breasted" or "pigeon-breasted"), or the sternum may be depressed or "funnel-shaped," the antero-posterior diameter being diminished. Harrison's groove is a transverse depression passing outward from the xiphoid process, on either side, toward the axillæ.

The long bones may be twisted and curved according to the forces which have been most frequently exerted upon them. The results of too early walking, for instance, are such deformities as bow-legs and knock-knees. The radius, ulna and tibia often show marked deformities. These are most frequently seen in the wrist and ankle, which are markedly enlarged over the epiphyseal region. A result of this condition is deformity of the pelvis—a frequent cause of dystocia. The spleen is often enlarged. A tendency to bronchial and pneumonic affections is a result of this disease.

DIAGNOSIS.—The diagnosis depends upon the recognition of at least some of the characteristic signs, including "the rosary," the box-shaped head, the open fontanels, delayed dentition, the enlarged epiphyses and deformities due to softened bones. The hydrocephalic head may have some points of resemblance to the rachitic, but it is usually rounded on top, while the latter is flattened. The rachitic child is intellectually bright, the hydrocephalic often dull. Syphilis, scurvy and Pott's disease all have some points of resemblance but are readily differentiated if a search is made for the cardinal signs of rickets, especially "the rosary."

PROGNOSIS.—The prognosis as to life is good, but the susceptibility to complicating diseases often makes infancy precarious. There is likely to be some permanent deformity.

TREATMENT.—The treatment should be mainly dietetic and hygienic. The best surroundings possible should be provided, with access to outdoor air and sunshine. If possible the mother should nurse the child unless her milk is plainly poor. Cow's milk is next in value to breast-milk and should be taken fresh, properly diluted, when a good quality is obtainable; if there is a possibility of infection, as in large cities, it should be properly sterilized. In general, there should be an increased proportion of fats and proteids in the food, but the proportions between the different elements should be well balanced. If

there is too much fat in the food it may be detected in the stool. Zweifel (Fischer's Infant Feeding) recommends the addition of salt to the milk (5 grams to the pint), believing that this will help to prevent the disease. Older children may take in addition to the milk, meat, eggs, the cereals, cream and butter. The prepared foods and condensed milk are not suited to rachitic children.

Cod-liver oil is a favorite remedy and may be used to replace other fats or in addition to them when well tolerated by the stomach. Phosphorus in some form may also be taken, either as pills, in solution, or as compound syrup of hypophosphites, or the glycerophosphate of lime (1 to 5 grains after feeding). The following formulas have been suggested:

Phosphorus	gr. 1
Alcohol (absolute)	m. 350
Spirits peppermint	m. 10
Glycerin	oz. 2

Dose 10 minims, containing $^1/_{132}$ grain of phosphorus.

Fischer recommends the following:

Phosphorus	gr. $^1/_7$
Oil sweet almonds	dr. 2½
Powd. acacia	gr. 72
Syrup	m. 72
Water	oz. 2½

One to two teaspoonfuls a day, in divided doses.

Or—

Elixir phosphorus	dr. 3½
Cod-liver oil	oz. 2
Powd. acacia, a sufficient quantity.	
Oil sassafras	gtt. 15
Water, enough to make	oz. 4

In case of anemia iron is indicated, while arsenic sometimes proves useful. The peptonate of iron and manganese is a pleasant preparation. Eisenzucker (saccharated iron) is readily given to children or the following formula may be prescribed:

Syr. iron iodid	dr. 1½
Cod-liver oil	oz. 1½
Syrup lactophosphate of lime	oz. 1½

One-half to one teaspoonful three times a day.

Fischer speaks highly of the sea-salt bath. Two or three pounds of bran and one pound of sea-salt are put in a bag made

of cheesecloth and this placed in the bath half an hour before it is to be used. The temperature is 80° to 100° F. He prefers a cool bath with friction. Massage will also be found useful in stimulating the nutrition.

REMITTENT FEVER—See Malaria.

RENAL CALCULUS—See Nephrolithiasis.

RHEUMATISM, ACUTE; RHEUMATIC FEVER.

DEFINITION.—An acute infectious disease characterized by fever, painful inflammation of the joints, and a tendency to cardiac complications.

ETIOLOGY.—Acute rheumatism is often hereditary, occurs with slightly greater frequency in males than in females and is most common in young adults, between the ages of fifteen and forty. It is probably more frequent in young children than was formerly thought to be the case; "growing pains" are now believed to be rheumatic and chorea is probably of the same nature. Among young children it is more frequent in females. Cold, damp climates seem to predispose to the disease and attacks may be precipitated by exposure or injury. It is most common in the late winter and early spring.

Several theories have been proposed to explain the pathogenesis of rheumatism. (1) The chemical theory ascribes it to the presence of a chemical irritant in the blood—lactic or uric acid. Haig is the leading advocate of the uric acid theory. (2) The nervous theory was advocated by J. K. Mitchell. At present it has few adherents. (3) The infectious theory is generally accepted and is constantly gaining ground. This ascribes the disease to bacterial infection. A number of observers have described bacteria, but their evidence does not seem conclusive. Poynton and Paine (Practitioner) have very recently described a diplococcus which they assert to be at least a cause, if not the specific cause. This has also been studied by Plimmer. Newsholme in the last Milroy lectures submits strong evidence to show the infectious and epidemic character of the disease. He believes that the germ usually finds entrance into the body

through the tonsils or naso-pharynx. This explains the well-known relationship between tonsillitis and rheumatism.

PATHOLOGY.—The synovial membrane of the affected joint is hyperemic, swollen and covered with a fibrinous exudate; a serous infiltrate containing fibrinous flocculi and leukocytes invades the joint and surrounding structures, including ligaments, tendons and muscles. In many cases there is inflammation of the serous membranes of the heart. There is anemia due to destruction of red blood corpuscles and a diminished percentage of hemoglobin.

SYMPTOMS.—For two or three days before the onset of the disease there may be headache, malaise, sore-throat or aching in the joints. The invasion is usually rapid—swelling, redness and pain in one or more joints being the prominent symptoms. The larger joints are most likely to be attacked, the disease usually beginning in the ankle, knee or wrist; the elbow, shoulder and hip joints suffer next in frequency; then the fingers, hands, spine, ribs, jaws, etc. More than one joint is usually attacked in the course of the disease and there is a distinct tendency for the inflammation to move suddenly from one joint to another, either upon the same or opposite sides. The disease is often symmetrical in its localization, that is, similar joints upon both sides are affected.

Pain and tenderness are very great and are aggravated by the slightest movement or pressure—sometimes even the weight of the bed-clothing causes distress.

The fever is usually moderate (101° to 103° F.), but in some grave cases it may be very high. Hyperpyrexia (104° to 110° F.) is occasionally associated with severe headache, delirium and convulsions, from which the patient may pass finally into a condition of coma. When the disease takes this form it is called "cerebral rheumatism;" it is very fatal. The pulse is somewhat accelerated, and may be very feeble in severe and complicated cases.

Profuse acid sweats are characteristic of acute rheumatism. The saliva is also acid and the urine scanty, high-colored, acid in reaction, and contains an increased amount of phosphates and urates and sometimes a little albumin. There are various skin eruptions, including sudamina due to the excessive sweat-

ing, erythema multiforme or nodosum, urticaria and purpura. The last named may be severe, and extensive hemorrhages into the skin and mucous membranes sometimes occur. These cases are known as *peliosis hemorrhagica.*

COMPLICATIONS.—The most common complications are those of the heart. Endocarditis occurs in 25 to 30 per cent of the cases. The cardiac inflammation is nearly always of the verrucose variety and the mitral valves are most likely to be affected. Complete recovery may follow but in many cases it leaves a permanent defect of the heart.

Pericarditis occurs in probably 10 per cent of the cases. Myocarditis is rare. Rheumatism may also cause inflammation of the pleura or peritoneum.

Tonsillitis and chorea are closely related to rheumatism and either may precede or occur in association with it.

DIAGNOSIS.—This is usually not difficult. Gout attacks the small joints, occurs late in life and is not associated with much fever. Gonorrheal rheumatism usually attacks only a single joint, often the knee and the constitutional symptoms are usually less severe. There is also a definite history of a recent attack of gonorrhea. Scarlatinal rheumatism follows the specific disease. Septic arthritis may be confused with acute rheumatism but it does not change from joint to joint, its onset is usually slower, there are no acid sweats and local symptoms overshadow the constitutional ones.

PROGNOSIS.—Mild cases may yield to treatment within a week; the more severe often persist the proverbial "six weeks" or longer. Most cases recover but the disease often leaves a weakned heart. Hyperpyrexia, pneumonia and the more severe inflammations of the heart make the prognosis more grave.

TREATMENT.—A patient who is so unfortunate as to be attacked by rheumatic fever should be put to bed at the first appearance of the disease, in a well-ventilated room of even temperature (65° to 70° F.), free from drafts. He should wear a flannel nightgown and lie between woolen blankets upon a soft mattress. The diet should consist largely of milk, or of milk toast, buttermilk, malted milk, farinaceous foods, gruels, vegetable soups, light custards, and soft eggs. Meats, and especially lean meats, should be excluded and concentrated broths,

meat extracts, rich gravies, sweets, wines and liquors forbidden.

The medicinal treatment of rheumatism consists mainly in the use of the salicylates in some form. These reduce the fever, relieve the pain and cut short the inflammation. Just how they act is not known. Ewart (British Medical Journal), in discussing the question, says it may be in any one of three ways, according to the opinions of different men: (1) They may be simply antipyretic; (2) they may have a specific destructive effect upon the bacteria or their toxins; (3) their beneficial effect may be due to stimulation of the protective function of the liver, whereby it is enabled to suppress the morbid material circulating in the blood. According to Haig the benefit is due to increased elimination of uric acid produced by the salicylates. Until we have a clearer conception of the pathogenesis of the disease their mode of action will, of course, remain largely speculative. Nevertheless we have learned to look upon the salicylates as almost specifics. Sodium salicylate is most generally useful. It should be administered in large doses until its physiological effects are produced. Usually 15 to 20 grains should be given every two hours for six doses, then at longer intervals. As a rule not more than two drams of the drug should be given daily. If improvement will follow its use, usually it will be seen within forty-eight hours. After that it should be continued, but in a smaller dose; 10 grains three or four times daily will suffice in most cases. Sodium salicylate is preferably given in solution; in this form it is most active and less likely to disturb the stomach. It may, however, be given in 5 grain capsules if the liquid form is objectionable. A convenient prescription, used at the Massachusetts General Hospital, is the following:

Sodium salicylate	oz. ½
Comp. tinct. lavender	dr. 4
Glycerin	oz. ½
Water, enough to make	oz. 8

Tablespoonful every hour or two until pain and fever abate.

If albuminuria occurs it is wise to avoid the salicylates and give salines and alkaline diuretics.

When it is necessary to prolong the administration of a salicylate it should be given with iron on account of the tendency of the drug to produce anemia, as in the following:

Salicylic acid .....dr. ½
Iron pyrophosphate .....dr. 1
Sodium phosphate .....dr. 10
Water, enough to make.....oz. 6

Tablespoonful every two hours until relieved.—Peabody.

Probably next in value is the salicylate of methyl or oil of wintergreen, which contains about 90 per cent of it. The former was used with great success by Lasserre. One or two grams (15 to 30 grains) are given daily and this quantity may be increased fourfold if thought necessary. Cosma used the following:

Methyl salicylate .....dr. 2
Mucilaginous solution .....oz. 4½
Rum .....dr. 6
Syrup .....dr. 6

To be taken in twenty-four hours.

The oil of wintergreen may be taken in 5 to 10 drop doses in soft capsules, milk, or emulsion, or in the following:

Oil wintergreen .....dr. 4
Alcohol .....oz. 4
Syrup .....oz. 4

Teaspoonful in Vichy three times a day.

Salol is worthy of trial where sodium salicylate fails or providing its administration is prevented by disturbance of the stomach. The dose is 5 grains every two hours. Other drugs of this group which have come in for more or less praise are salicin, salophen and aspirin. The dose of any of these is 10 to 20 grains. Acetanilid is recommended by Hare, and others praise antipyrin and phenacetin. These drugs relieve the pain but are depressing.

There is much difference of opinion as to the influence of the salicylates upon the occurrence of cardiac complications. It is, however, believed by many excellent authorities that the salicylates serve to prevent cardiac complications in many cases, but that they do not modify the course of such a complication if it has once become established. There is quite general agreement that the best drugs, both for prophylaxis and relief of heart complications, are the alkalies, sodium or potassium bicarbonate or potassium citrate. Dickenson states that in his cases heart complications occurred once in fifty-four cases under the alkalies and once in twelve cases under the salicylates alone. Luff (Prac-

titioner) gives 20 grains of sodium salicylate and 30 grains of potassium bicarbonate every two hours until pain is relieved and then continues the same in smaller doses. Potassium citrate is a favorite alkaline. Sodium bicarbonate may be given in the following:

Sodium salicylate	dr. 4
Sodium bicarbonate	dr. 6
Glycerin	oz. 1
Elixir lactopeptine, enough to make	oz. 8

Dessertspoonful every two to four hours.

In some cases, especially those subacute in character, potassium iodid acts well in combination with other drugs. The following is used in the Pittsburg Free Dispensary:

Sodium salicylate	oz. ½
Potassium iodid	dr. 1
Methyl salicylate	dr. 1
Fl. ext. cimicifuga	dr. 2
Alcohol	oz. ½
Water, enough to make	oz. 3

A teaspoonful three times a day.

A prescription which the author has used with excellent results and especially during the subacute stage contains:

Sodium salicylate	dr. 4
Potassium iodid	dr. 4
Potassium acetate	dr. 4
Fl. ext. cascara sag	oz. 1
Glycerin	oz. 1
Elixir licorice arom. (N. F.), enough to make	oz. 6

Teaspoonful in a little water every four hours.

Local treatment is of great value. The affected limb should be covered with cotton and held immobile by a well-padded splint. In many cases the use of heat adds to the patient's comfort. Salt-bags, hot-water bags or hop poultices are convenient household remedies. On account of the extreme sensitiveness of the parts the application of a liniment with friction is usually difficult. Those containing wintergreen or some of its derivatives are useful. Hatfield prescribes:

Oil wintergreen	oz. ½
Spts. chloroform	oz. ½
Soap liniment	oz. 3

Apply freely and wrap the joint in cotton batting.

Opium and lead water may be applied on compresses in the same way:

Tinct. opium .....dr. 4
Sol. lead subacetate.....oz. 3½

The pure methyl salicylate, about 20 drops being applied slowly and the part well covered, often gives decided relief. Luff uses this remedy as follows: A teaspoonful of the drug is poured upon a piece of lint, applied to the swollen joint and covered with gutta-percha tissue which is sealed to the skin at the edges, by wetting it with a little chloroform. A bandage is now applied. After twelve hours the dressing is removed. Salicylic acid may also be applied in an ointment of a strength of 15 to 20 per cent. The following formula has been suggested:

Salicylic acid .....dr. 2½
Oil turpentine .....dr. 2½
Lanolin .....dr. 2½
Lard, enough to make.....oz. 3½

To be spread thickly on muslin and kept in place with a flannel bandage.

In very severe cases decided relief follows the application of one or more blisters to the affected joint.

If *cardiac complications* occur or seem to be impending we should continue the salicylate and alkaline treatment and keep the patient absolutely quiet in bed. An ice-bag may be placed over the region of the heart and small doses of morphin administered if there is much pain or restlessness. Dickinson has been struck by the fact that immunity from heart complications is coincident with free arthritic effusions. He therefore suggests the use of blisters to the joint if the effusion is scanty. Blisters or leeches may also be applied over the cardiac region in case of inflammation. Caton thinks the nutrition of the heart may be stimulated by small blisters over the first four dorsal intercostal nerves on each side, upon the upper portion of the chest between the clavicle and nipple. He applies one at a time and follows with a poultice. He also gives 8 or 10 grains of potassium or sodium iodid three times a day to promote the absorption of any endocardial exudate. If the heart's action becomes weak, strychnin, ammonium carbonate or aromatic spirits of ammonia may be required.

RHEUMATISM, CHRONIC.

DEFINITION.—A chronic affection of the joints, occurring late in life and characterized by gradual structural changes.

ETIOLOGY.—Chronic rheumatism is gradual in its onset and is often hereditary, attacking persons of the rheumatic diathesis. It seldom appears before middle life. Females are more frequently affected than males. Occupations which require frequent or prolonged exposure to wet and cold and severe muscular labor are predisposing causes. It occasionally follows acute or subacute rheumatism.

PATHOLOGY.—There is infiltration and thickening of the capsule, ligaments, tendon-sheaths and other joint structures, and injection of and sometimes slight effusion from the synovial membrane. Rarely there are erosions of the cartilages. The inflammatory changes cause stiffness, restricted movement, contraction of the tendons and muscular atrophy from disuse.

SYMPTOMS.—Pain and stiffness of the joint are the earliest symptoms and usually appear very gradually. The pain is increased by motion, is worst in the early morning hours, often causing insomnia and in many patients is particularly troublesome before a storm. Cold, damp weather aggravates it. Stiffness is also worst in the morning but at the beginning disappears upon exercise. Later there are tendinous contractions and the joints become swollen and their outlines distorted. During acute exacerbations the surface may be red and tender. The fingers are often permanently flexed and the knees bent. There may be actual ankylosis. Upon forcible extension or pressure a crackling noise may sometimes be heard. Fever and other constitutional disturbances are usually absent but there may be slight rise of temperature during an acute exacerbation. The general health is usually good. Sometimes the constant suffering and loss of sleep undermines the general health. Heart complications are rare.

DIAGNOSIS.—Usually very easy. See Rheumatoid Arthritis.

PROGNOSIS.—Chronic rheumatism does not cause death and rarely shortens life. When structural changes have occurred they cannot be removed.

TREATMENT.—Rheumatic persons should avoid unnecessary

exposure to the cold and moisture, should avoid muscular strains and in severe cases, if their means permit, spend their winters in a warm climate. Woolen should be worn next the skin, especially over the affected joint or joints. The diet should be nutritious but simple, milk, eggs, cereals, fruits and vegetables predominating. Rich foods, highly seasoned dishes, sweets, large quantities of lean meats and wines and malt liquors are to be avoided. The free use of the alkaline mineral waters is decidedly beneficial. Moderate exercise is to be encouraged.

Hydrotherapeutic measures are of distinct value in modifying the inflammatory process. Hot water or vapor baths, if care is taken to avoid chilling the skin after they are taken, relieve the pain and improve the mobility of the joint. Better are hot douches or effusions (105° to 110° F.), followed by cold applications (60° to 70° F.) with friction, massage and passive motion. The hot sulphur springs and mud baths are highly praised for this condition.

Dry superheated air has in the last few years been extensively used for chronic rheumatism and sometimes with quite remarkable results. The limb is wrapped in a Turkish towel and placed in an enclosed chamber in such a way that it does not come in contact with its walls; a canvas curtain is brought tightly around it externally to prevent escape of the heat. The temperature of the chamber is then raised to 200° to 300° F., at which it is maintained for some minutes—even an hour. This is said to stimulate the nutrition of the part and promote the absorption of the exudate. Blisters are useful if there is much effusion into the joint and the thermocautery is also sometimes employed.

Liniments and similar local applications are in great favor with the laity. While they do not modify the disease they certainly do give some relief to the pain. The following are useful liniments:

Tinct. aconite	dr. 2
Tinct. opium	oz. 1
Oil turpentine	oz. 1
Soap liniment, enough to make	oz. 8

Use as a liniment three times a day.—Hare.

Chloroform ..... oz. ½
Tinct. aconite ..... oz. ½
Oil turpentine ..... oz. ½
Oil sassafras ..... m. 5
Comp. soap liniment ..... oz. 2½

Liniment.—Gerhard.

Oil wintergreen ..... dr. 2
Oil sassafras ..... dr. 1
Chloroform ..... oz. ½
Tinct. capsicum ..... dr. 2
Tinct. opium ..... oz. 1
Spirit camphor, enough to make ..... oz. 4

Liniment.

For the reduction of enlargements of the joint Hare recommends:

Ichthyol ..... oz. ½—1
Lard ..... oz. 1

Rub in thoroughly.

Internal treatment is of less value than some of the local methods, especially hydrotherapy and hot air. The salicylates sometimes do good but are far less useful than in acute rheumatism. The iodids are probably the most useful; they are believed to stimulate absorption of plastic deposits. Guaiacum, colchicum, cimicifuga, sulphur, arsenic and other alterative drugs have a limited field of usefulness. The following are selected formulas:

Potassium iodid ..... oz. ½
Wine colchicum seed ..... oz. 1
Comp. syrup sarsaparilla ..... oz. 3
Water, enough to make ..... oz. 6

Dessertspoonful three times a day.—Roosevelt Hospital.

Fowler's solution ..... m. 48
Potassium iodid ..... dr. 4
Sodium salicylate ..... dr. 4
Comp. syr. sarsaparilla ..... oz. 1
Peppermint water, enough to make ..... oz. 3

Teaspoonful in water after meals.—Thornton.

Potassium iodid ..... dr. 2
Salicin ..... dr. 2
Fl. ext. manaca ..... dr. 2
Tinct. cimicifuga ..... oz. 1
Lithiated hydrangea, enough to make ..... oz. 6

Teaspoonful, diluted, every three or four hours.

Sodium iodid .....dr. 4
Wine colchicum .....dr. 4
Ammon. tinct. guaiac.....dr. 7
Fl. ext. erythroxylon.....dr. 7
Fl. ext. cimicifuga.....dr. 6

Teaspoonful three times a day.—Eshner.

If there is anemia, iron and arsenic should be given; if nervous debility, strychnin, quinin, phosphorus and similar drugs will be found useful. Cod-liver oil, syrup of hypophosphites and maltine, plain or in combination, are valuable when the patient is run down and emaciated. The excretory functions should of course receive proper attention; in torpid conditions the mixture of sulphur and cream of tartar in teaspoonful doses is an old and favorite remedy.

RHEUMATISM, MUSCULAR.

DEFINITION.—A painful inflammatory affection of the muscles.

ETIOLOGY.—The condition is often hereditary and occurs most frequently in individuals of the rheumatic and gouty diatheses. Men suffer more than women on account of their greater liability to exposure. Exposure to cold or damp, chilling of the skin when it is wet with perspiration, and severe manual labor are important factors in the production of the disease. The underlying cause is not known but it is supposed to be the same, perhaps in an attenuated form, as that of acute rheumatism. The presence of uric acid in the blood is considered the causative factor by Haig.

PATHOLOGY.—The morbid anatomy is not very clear. It is generally believed to be a myositis, or inflammation of the muscles, their sheaths, fascia and the periosteum to which they are attached. Some authorities consider the condition an affection of the sensory nerves.

SYMPTOMS.—Pain is the principal symptom. This is usually severe; it may be dull and boring or sharp and lancinating, is increased by motion and generally relieved by deep, firm pressure. In the acute forms there is tenderness, especially at the origin and insertion of the muscles. Sometimes the part is

swollen. Constitutional symptoms are usually absent but in a few cases there is a slight rise of temperature. There are several clinical forms which are known by special names.

Lumbago is characterized by severe pain, sudden in its onset, felt in the loins—in the lumbar muscles. The pain is made excruciating by attempts at change of position.

Pleurodynia.—The pain is localized in the intercostal and sometimes the overlying thoracic muscles; it usually occurs upon the left side only. It is increased by respiration, coughing, sneezing, etc. Tenderness is usually marked over the affected muscles.

Torticollis (wry neck) affects the muscles of one side of the neck, drawing the head over in that direction. In looking around the patient turns the entire body to avoid moving the neck.

Cephalodynia is a painful affection of the muscles of the scalp.

Other forms of muscular rheumatism are omodynia, pain in the shoulder, scapulodynia and dorsodynia, affecting regions of the back, and abdominal rheumatism.

Diagnosis.—In neuralgia the pain is more paroxysmal and is not produced by movement. Neuritis presents localized pain and marked tenderness along the course of the nerve; pain in muscular rheumatism is usually relieved by firm pressure. Intercostal neuralgia may be recognized by painful points along the course of the nerve. In pleurisy there is fever and the physical signs of pleural inflammation.

Prognosis.—Muscular rheumatism never causes death. Complete recovery from an acute attack usually occurs within four or five days but there is a marked tendency to recurrence.

Treatment.—Patients subject to myalgic pains should exercise the care as to exposure, diet and clothing advised for rheumatics generally. The pains when severe require the hypodermic use of morphin. In less severe cases acetanilid or phenacetin will be sufficient when combined with proper local treatment. If there is a rheumatic or gouty diathesis the salicylates are to be given. Any of the formulas advised for acute rheumatism will answer the purpose, or the following may be tried:

Codein ..... gr. 5
Acetanilid ..... gr. 40
Sodium salicylate ..... dr. 1

Make 20 capsules. Take two capsules every two or three hours for pain.

Ammonium chlorid in 10 to 20 grain doses three or four times daily is a valuable remedy; Hare advises that it be given in solution with extract of licorice. Fluid extract of cimicifuga (½ to 1 dram) is also a favorite remedy. Anstie recommends:

Ammonium chlorid ..... oz. 1
Fl. ext. cimicifuga ..... oz. 2
Syr. acacia ..... oz. 1
Cherry laurel water ..... oz. 1

Teaspoonful three or four times a day.

Potassium iodid is to be preferred in cases tending to chronicity. It may be combined with sodium salicylate, potassium acetate, cascara, etc. (see Acute Rheumatism for formula). Guaiac, sulphur and similar drugs are sometimes used. Eshner finds the following of service:

Ammon. tinct. guaiac ..... oz. 1
Fl. ext. cimicifuga ..... oz. 1
Fl. ext. coca ..... oz. 1

Teaspoonful before each meal.

Local measures are usually sufficient to produce relief. The affected part should be put at rest. In pleurodynia the chest may be immobilized by strapping with adhesive strips. In a mild case rubbing with any good liniment is sufficient. The following may be used:

Oil wintergreen ..... dr. 1
Menthol ..... dr. 1
Tinct. belladonna ..... dr. 4
Chloroform ..... dr. 4
Alcohol ..... oz. 1
Camphorated oil, enough to make ..... oz. 1

In a severe case hot salt bags, hot compresses, hot turpentine stupes, a mustard plaster, a big linseed poultice or the application of cups may prove more effective. A popular and potent domestic remedy is to "iron" the affected muscles; a flannel cloth is laid over the part and a hot flat-iron passed over it with some pressure. Acupuncture sometimes gives decided relief. This consists of plunging needles three or four inches long into

the muscles; they are not withdrawn for about ten minutes. A hot Turkish or vapor bath, if it is to be had, will sometimes bring the pain to an abrupt close.

RHEUMATOID ARTHRITIS; ARTHRITIS DEFORMANS; RHEUMATIC GOUT.

DEFINITION.—A disease of the joints characterized by marked deformity. This is caused by destruction of the cartilaginous and other structures and by bony overgrowths which restrict their mobility.

ETIOLOGY.—Rheumatoid arthritis occurs five times as often among females as males and is most frequent between the twentieth and fortieth years, though it may occur at any age. The beginning and close of menstrual life are critical periods. After the menopause the disease may take on greater activity. Poor hygienic surroundings, worry, nervous strain and profound emotional disturbance are said to be predisposing causes. It occurs both among rich and poor. Heredity seems to play some part in its etiology. The disease is not closely allied to either rheumatism or gout. J. K. Mitchell ascribed it to a trophoneurosis. Others believe it infective.

PATHOLOGY.—The most poorly nourished portions of the joint suffer worst. The cartilages degenerate, soften and are eroded along their articular surfaces, finally leaving the ends of the bones exposed. These become very hard, or "eburnated," and thickened; later they atrophy. The synovial membranes are also infiltrated and thickened and the marginal cartilage cells multiply, become osseous and form bony masses or osteophytes which limit the mobility of the joint. Sometimes there is synovial effusion. The overlying muscles become atrophied and add further to the deformity.

SYMPTOMS.—In most cases the disease is multiple, a number of joints being affected. The process may be acute or chronic.

The *acute form* occurs with the greatest frequency in young women between twenty and thirty. Young children are sometimes attacked. A number of joints become simultaneously swollen, tender and painful, and there is some fever. The attack simulates acute rheumatism but the joints are not red and

the disease shows no migratory tendency. The condition tends to recrudescence or to chronicity.

The *chronic form* is the most common. It comes on gradually. The joints of one hand are first affected, then the corresponding one of the opposite side, then the knees, feet, ankles, wrists, elbows, shoulders, etc., until in severe cases all the joints are attacked. The development is symmetrical throughout. The pain varies but is increased by motion. There is little or no tenderness and the joints are not reddened. The deformity is characteristic. The joints are enlarged, this prominence being accentuated by the atrophy of the overlying muscles; the fingers are usually drawn to the ulnar side, flexed upon the hand and may overlap; motion elicits a crackling sound and becomes increasingly difficult until the joints become completely locked; the knees are similarly flexed and ankylosed, the arm drawn up at the elbow and the other joints suffer in turn if the disease progresses. The thumb, singularly enough, retains its mobility and in the long run the hand suffers less than many of the other joints. Trophic changes include disturbances of sensation, local increase of perspiration and pigmentation of the skin. In advanced cases there may be gastro-intestinal disturbances. There is increased rapidity of the pulse (90 to 120).

Heberden's nodes are prominences which make their appearance at the sides and ends of the distal phalanges. The joints are at first painful, tender, red and swollen, but finally hard nodules form which cause permanent deformity. This condition should not be confused with gout. The large joints are seldom invaded in this form of rheumatoid arthritis. Women thirty to forty years of age are most likely to suffer.

A monarticular form of the disease is described which generally occurs in old men, attacks the hip joint and is ascribed to an injury.

DIAGNOSIS.—Chronic rheumatism attacks men as frequently as women, is a disease of late middle life, selects the large joints, is not markedly symmetrical in its development, and produces less deformity and not such marked fixation of the joints.

Gout attacks the great toe most frequently, presents frequent exacerbations when pain and tenderness are intense, is not symmetrical and the deformity is due to chalky deposits, or

tophi, instead of the bony growths or osteophytes of Heberden's nodes.

PROGNOSIS.—The disease is incurable but does not endanger life. Its course may be arrested but the tendency is to progression.

TREATMENT.—Patients should, if possible, reside during the winter months in a warm, dry climate, should spend as much time as possible out of doors, take moderate exercise and wear flannel next the skin. Extremes of temperature should be avoided. The diet should be generous and nutritious, an abundance of milk, eggs, meat and other simple food being provided. In fact, the principal aim of treatment is to raise the nutritive standard as high as possible.

Cod-liver oil, the maltine preparations, iron, arsenic and the bitter tonics are useful. Potassium or sodium iodid is recommended but should not be continued if it disturbs the stomach. Iodid of iron is a favorite remedy; two or three of the official pills may be given three times a day or 15 to 30 minims of the syrup of iodid of iron. Sodium salicylate is of some value in acute cases.

Local treatment is of great value. When the patient can afford it a course of treatment at one of the foreign or domestic "hot springs" is helpful. Hydrotherapeutic measures and massage may be used anywhere and stimulate nutrition and correct the tendency to muscular atrophy better than most other methods. The alternate hot and cold douche is a useful expedient. The electric bath, the hot local vapor bath and dry superheated air are all recommended. The latter is employed as directed for chronic rheumatism. Hot Turkish or other general baths which produce free perspiration and some consequent exhaustion are not advisable; the disease cannot be "sweat out." The mud-baths have also been highly praised. Swedish movements help to maintain the mobility of the joints.

RHINITIS, ACUTE; CORYZA.

DEFINITION.—Acute rhinitis is an acute inflammation of the mucous membrane and submucous tissues of the nasal passage.

ETIOLOGY.—The most frequent exciting cause is exposure to sudden change of temperature. Draughts on the back of the

neck, chilling of the feet or the body, the inhalation of dust or acrid vapors frequently produce this condition. Chronic hypertrophic rhinitis, obstructive growths or deformities are conditions that predispose to frequent attacks. In depression or exhaustion there is greater susceptibility on exposure. Many cases are doubtless due to infection by microorganisms, as demonstrated by the coryza accompanying influenza. It is reasonable to suppose that microorganisms often migrate to the nasal cavities from inflamed or diseased tonsils and become the exciting cause.

SYMPTOMS.—The nostrils first feel dry, hot and stuffed. There is itching, accompanied by sneezing and a sense of fullness in the frontal region. If the frontal sinuses become congested this develops into a dull ache. In a few hours, twelve to twenty-four, an acrid, watery discharge appears producing excoriation of the anterior nares and upper lip. This discharge gradually changes to mucus and often becomes muco-purulent with streaks of blood. Because of the swelling of the membrane one or even both nostrils may be occluded. This produces much discomfort and obliges the patient to breathe through the mouth, causing dryness of the throat and a sense of dyspnea.

The sense of smell is less acute and that of taste may be affected. The eyes become reddened and watery. Lack of resonance gives the voice the so-called "nasal twang." There is slight elevation of temperature (100° to 101°), accompanied by a corresponding increase in the pulse rate, with pain in the back and limbs. Extension of the disease to the middle ear or accessory cavities is marked by special symptoms pointing to the locality. Inspection of the parts shows swelling of the turbinated bodies and the membrane to be of a darker red color.

DIAGNOSIS.—The diagnosis is usually easy. It may be distinguished from *erysipelas* by the fact that the latter generally extends externally on the nose and lip and is marked by much graver symptoms.

The coryza of *measles* may be distinguished when the characteristic rash appears.

Hay-fever persists for a longer period and occurs in certain months, usually August and September. There may also be the history of a previous attack.

PROGNOSIS.—In simple acute rhinitis without complications recovery usually takes place in five to ten days. Repeated attacks may bring on a chronic form of the disease.

TREATMENT.—If the case is seen early, a moderate dose of Dover's powder may be given at bed-time. Quinin is largely used to abort the attack. There is much doubt concerning its value after the disease has become fully established. Probably nothing is more effective at the beginning of an attack than the administration of a brisk purge. This, together with a hot foot bath and a bowl of hot lemonade at bed-time, may be sufficient to afford the needed relief. A hot water bottle may be substituted for the foot bath.

A tablet or capsule made similar to the following formula is largely used:

Fl. ext. belladonna	gr. $\frac{1}{8}$
Camphor	gr. $\frac{1}{4}$
Quinin sulphate	gr. $\frac{1}{4}$

One capsule to be taken every one to two hours. The amount can be changed or additions made to suit the prescriber.

If atropin is preferred to the belladonna extract it may be substituted in the above formula. Pilocarpin is valuable to produce sweating. An excellent mixture is one composed of the tinctures of aconite and belladonna. This should be given in small doses every half hour to hour. The aconite serves to reduce the pulse rate, while the belladonna dilates the cutaneous capillaries. At the commencement of the coryza salicin in 20 grain doses, repeated every four hours, is valuable.

Local treatment is of great importance. An alkaline solution similar to Dobell's or Seiler's may be used in an atomizer with great profit. Casselberry recommends the following:

Menthol	gr. 1
Oil eucalyptus	m. 3
Oil wintergreen	m. 3
Sodium bicarbonate	gr. 15
Sodium borate	gr. 15
Glycerin	dr. 3
Water, enough to make	oz. 1

Dilute, adding one teaspoonful to one ounce of warm water, for use as a spray.

Menthol is considered extremely useful from its power to contract the capillaries and relieve pain and fullness. It may be used with liquid petrolatum. Thymol or eucalyptol is frequently added to the prescription:

Menthol .....gr. 5—10
Eucalyptol .....m. 6
Liquid petrolatum .....oz. 2
Use with an atomizer several times a day.

Vapors sometimes afford considerable relief. A pint or more of steaming hot water may be placed in a vessel. To this add one to two teaspoonfuls of the spirit of camphor or the same amount of compound tincture of benzoin. A funnel made of paper, pasteboard, or, better still, glass, is placed over the vessel with the small end in one nostril. (Using an ordinary teapot would avoid the necessity of the funnel.) The medicated steam should be inhaled for twenty or thirty minutes. The best time for this inhalation is immediately before retiring.

RHINITIS, CHRONIC; CHRONIC NASAL CATARRH.

DEFINITION.—A chronic inflammation of the nasal mucous membrane.

ETIOLOGY.—By far the most important factor in the causation of this condition is repeated attacks of the acute form. Any occupation that exposes one to dust, irritant vapors or climatic changes is favorable to the production of the disease. Any obstruction to the nasal passages, such as spurs, deviations of the septum or deformity of the turbinals, may produce chronic *hypertrophic rhinitis*. If the obstruction exists in the anterior portion, the hypertrophy is likely to be found in the posterior part. In children it is thought to be frequently caused by the habit of some mothers of laying infants always upon one side to sleep.

Constitutional conditions must be considered of importance as remote causes. It is more liable to occur in the neurotic, gouty, syphilitic and those with defective nutrition. There is great susceptibility in any case with broken-down constitutions.

In *atrophic rhinitis* or ozena the cause is not fully established, but it generally follows the hypertrophic or a purulent form of

catarrh. In this condition heredity may have an important bearing.

PATHOLOGY.—Chronic catarrh of the nose is usually divided into two varieties—the hypertrophic and the atrophic. In the hypertrophic form there is thickening of the mucous membrane, especially that covering the turbinated bones. At the anterior and posterior ends of the lower turbinal and along its lower border is located the erectile tissue of the nose. Repeated engorgement of this tissue gradually changes from a diffuse infiltration to a circumscribed thickening. In appearance the surface may be smooth or mulberry-like and bright red in color, though sometimes in the posterior portion a glistening white. The middle turbinal may be so enlarged as to press against the septum. The secretion is abundant.

In the atrophic form there is destruction of the ciliated columnar cells and a shrinking of the entire mucous membrane and even the bone itself. This results in an enlarged cavity which is lined with yellowish green crusts, giving rise to a characteristic disagreeable odor. Not infrequently there is perforation of the cartilaginous septum and an extension to the accessory sinuses.

SYMPTOMS.—In *hypertrophic rhinitis* the most important symptom is more or less obstruction to nasal respiration caused by the thickened tissue and enlarged turbinals. When lying on one side, it is found that the corresponding nostril is perhaps entirely occluded, and on bending the head forward there is obstruction to both.

The necessity of mouth breathing causes much dryness and discomfort to the throat. The secretion is usually thick and mucopurulent but devoid of a bad odor. This accumulates in the naso-pharynx, where it gives rise to a disagreeable sensation. Efforts are made to open the passages by blowing the nose or hawking and expectoration.

From lack of resonance the voice may have a nasal twang. There may be severe frontal headache due to pressure by the middle turbinal, facial neuralgia and eye affections, but the most important complication is extension of the catarrh to the naso-pharynx and along the Eustachian tube to the middle ear.

Tinnitus and vertigo may be unpleasant features of the latter condition.

The sense of smell may be impaired and likewise that of taste. There may be reflex disturbances such as are occasionally found in asthma, hay fever, cough, etc.

On examination with a nasal speculum and reflected light the anterior portion of the inferior turbinated bone is found greatly enlarged and bright-red in color. The middle turbinal may be found pressing on the septum. Pressure with a probe may reveal irregularities in the membrane. Post-nasal examination with a mirror may show hypertrophies red or white in appearance or mulberry-like.

In *ozena* the characteristic disagreeable odor is the chief subjective symptom. The patient is unconscious that his breath is foul, but usually complains of great dryness of the throat and of the loss of the sense of smell. Accumulation of mucus in the naso-pharynx is another unpleasant symtom. Sometimes crusts may be expelled by blowing the nose. On examination the nasal cavity is found large and roomy and covered with yellowish-green or green crusts. The turbinals are so much shrunken that the pharyngeal wall may be seen.

DIAGNOSIS.—The hypertrophied form is to be diagnosticated from polypi; this is not usually difficult with the use of the probe and cocain.

In the atrophic form the green crusts, enlarged space and peculiar odor are sufficient to distinguish the disease from all others.

PROGNOSIS.—In the atrophic form much relief can be obtained by treatment and possibly a few cases cured. In the other form the prognosis is favorable under proper treatment.

TREATMENT.—Whether the rhinitis is in the first stage or has existed for some time, attention should be paid to hygienic suroundings. If the air commonly breathed is vitiated, efforts should be made to effect a change. An attempt should be made to invigorate and improve the general health. In addition to other measures, a cold sponge bath every morning, followed by a brisk rubbing, will do much good in stimulating and regulating the circulation. It will also serve to prevent exacerbations of the disease. Attention should be paid to the diet,

clothing, regular hours and a proper air supply at home. The nose should be treated locally, but it may be necessary to examine carefully the bodily condition to discover the cause of the weak point.

In the *hypertrophic form* much can be done by the patient himself, if supplied with a hand atomizer, in cleansing the nasal passages of the discharge. Dobell's is an excellent alkaline solution for this purpose;

Carbolic acid	gr. 4
Sodium bicarbonate	gr. 8
Sodium biborate	gr. 8
Glycerin	oz. 1
Water, enough to make	oz. 4

If an oil spray is used instead the following is valuable, especially with profuse secretion:

Menthol	gr. 3
Oil cloves	m. 5
Terebene	m. 10
Liquid petrolatum	oz. 1

At the office the nares should be cleansed with an alkaline solution—Dobell's Seiler's, Sajous' or one that suits the fancy of the operator. The following is Sajous' formula:

Sodium bicarbonate	gr. 8
Sodium biborate	gr. 8
Fl. ext. pinus Canaden	m. 15
Glycerin	dr. 2
Water, enough to make	oz. 1

After the parts are cleaned, applications may be made of a solution of nitrate of silver in strength of 2 to 10 grains to the ounce. The application must be made regularly in order to prove effective. To avoid stains, protargol in 5 per cent solution may be used in place of the nitrate. Iodin is also an excellent remedy if mixed with glycerin as in this formula:

Iodin	gr. 6
Potassium iodid	gr. 16
Glycerin	oz. 1
Water	oz. 1

If the application irritates, an oil spray may be used immediately following: Krieg recommends this prescription:

Sodium sozoiodol.....gr. 15
Menthol .....gr. 15
Lanolin .....oz. ½
Vaselin .....oz. 1
Use as an ointment.

Resorcin, 10 per cent solution, may be used, or suprarenal extract in the same strength. This line of treatment may be successful in mild cases or in the earlier stages. When stenosis exists due to spurs, deformities or marked hypertrophies, recourse must be made to cauterization and surgical procedures.

In the *atrophic* form the patient can use the alkaline sprays or douches as some advocate, but will be unable to dislodge all of the crusts by any method. A solution of hydrogen peroxid, 1 part to 8 or 10 of water, is one of the most effective in this disease. To lessen the disagreeable odor equal parts of citric acid and milk sugar is recommended, to be used as a snuff. To obtain the best results the patient ought to receive treatment every day or every second day at the office. To loosen the crusts, they should be sprayed with a solution of peroxid of hydrogen and then removed by rubbing with a cotton-covered probe or applicator. After the dried secretion is thoroughly removed the parts should be brushed over with a solution of ichthyol in strengths varying from 10 to 50 per cent. It is well to use an oil spray in fifteen to twenty minutes after the use of the ichthyol. Ichthyol may also be used as a spray in 1 to 5 per cent solutions. The treatment must necessarily be continued for some time to accomplish good results.

RINGWORM - See Tinea.

RUBELLA; ROTHELN; GERMAN MEASLES.

DEFINITION.—An acute contagious disease, often epidemic, usually occurring in childhood and characterized by mild catarrhal symptoms and a skin eruption.

ETIOLOGY.—Rubella is actively contagious, but no specific microbe has as yet been found. It usually attacks children. Infection is probably carried in the air, conveyed by contact, fomites,, clothing, etc.

SYMPTOMS.—The period of incubation averages from 10 to

12 days, although Eichhorst puts it at from 14 to 21 days. The prodromal symptoms are usually mild or may be entirely absent. Sometimes there is chilliness, slight fever, malaise, loss of appetite, and a mild catarrhal inflammation of the conjunctiva and the mucous membranes of the nose and throat, for two or three days preceding the eruption. The rash may be the first symptom to attract attention. This consists of the appearance of a number of reddish, small to pea-sized maculo-papules or roseolæ upon the face and neck, rapidly spreading to the trunk and extremities. These spots are often confluent, giving a uniform redness to the skin not unlike that of scarlatina; at other times the eruption is paler and runs a very rapid course and disappears with slight desquamation of the skin. There is some itching. There is a slight febrile movement. Complications and sequelæ are rare. One attack usually confers immunity.

DIAGNOSIS.—It is often difficult to differentiate this disease from an attack of measles, but in the course of an epidemic it should be fairly easy. It also presents some points of similarity to scarlatina.

In measles the prodromic catarrhal symptoms are marked and precede the eruption by several days. The rash is characteristic and Koplik's spots are present.

Scarlatina is preceded by vomiting, sore throat and the strawberry tongue. The eruption is a characteristic diffuse redness and "scaling" is marked during convalescence.

PROGNOSIS.—Favorable.

TREATMENT.—Little treatment is required. The child should be kept in a room of uniform temperature, a mild laxative administered if the bowels are inclined to be constipated, a liquid but nutritious diet being allowed and, if there is fever, a mild diuretic and febrifuge administered, as the following:

Tinct. aconite	gtt. 4
Potassium citrate	dr. 3
Syrup lemon	oz. 1
Water, enough to make	oz. 4

Teaspoonful every two hours.

Usually, however, bathing with tepid or slightly cool water will be sufficient to reduce the temperature. After bathing in-

unctions of vaselin, lanolin or olive oil will relieve any itching of the skin.

RUBEOLA—See Measles.

ST. ANTHONY'S FIRE—See Erysipelas.

S.T VITUS DANCE—See Chorea.

SCABIES; THE "ITCH."

DEFINITION.—A contagious disease of the skin caused by the burrowing of the itch-mite or acarus and attended with severe itching.

ETIOLOGY AND PATHOLOGY.—The disease is caused by the acarus scabiei (sarcoptes scabiei), a small animal parasite barely perceptible to the naked eye. The female acarus after impregnation penetrates the skin, excavating a gallery or "burrow" in the horny layer, depositing her ova and dropping minute specks of feces as she advances. The presence of the itch-mite excites inflammation and a certain amount of serous infiltration, causing a papular, vesicular or pustular eruption in the neighborhood of the burrows. The mother acarus finally dies, the ova hatch out, find their way to the surface and make burrows of their own. The male acarus is much smaller than the female; it does not enter the skin. Scabies occurs mainly among the poorer classes and is acquired by contact with an infected person; his clothing, bedding or other belongings. It is more common in males than in females. Once acquired, the disease is frequently carried from one portion of the body to another by the fingers, the acari being picked up under the finger nails while scratching.

SYMPTOMS.—The eruption is most frequently found between the fingers at their juncture with the hand. Other favorite locations are the inside of the wrists, the axillae, the penis and scrotum, in males; the areolæ of the nipples in females, the anal region, the webs of the toes if the feet are uncovered—in fact, the portions of the body which are most likely to be scratched. The face usually escapes. The eruption consists of papules, vesicles or pustules, almost invariably torn by the fingers and covered with dried serum and blood. Close exami-

nation shows the burrows as minute, zigzag, slightly elevated, dark-colored, dotted lines, one-eighth to one-half inch in length. At the distal end or "head" of the burrow the acarus lies. The most troublesome symptom is the itching, which is intense and worst at night.

DIAGNOSIS.—The history of contagion, the location of the eruption, the presence of burrows and the intense itching usually make diagnosis easy. The microscope will clear up any difficulty. Eczema is hardly likely to be confused with this condition if the lesions are carefully examined; it may, however, complicate the case.

PROGNOSIS.—It yields readily to suitable treatment.

TREATMENT.—The usual method of treating scabies is as follows: The patient is first thoroughly scrubbed from head to foot with a strong alkaline soap and hot water, using a hand brush or scouring soap (sapolio) over the affected part if the skin is thick. After rinsing with hot water the body is dried with friction and the selected ointment applied. The medicinal agent is usually sulphur, since this is known to be a specific. Other remedies which may be used in place of it, if the sulphur is considered objectionable, or in combination with it, are beta-naphthol, balsam of Peru, styrax, stavesacre, tar, etc. The following ointments are satisfactory. Any one of them should be thoroughly applied, to the whole body if the disease is widely disseminated, two or three times a day.

Precipitated sulphur .....dr. 4
Prepared chalk .....dr. 4
Lard .....oz. 4

Or—

Precipitated sulphur .....dr. ½—1
Balsam Peru .....dr. ½—1
Lard .....oz. 1½

Or—

Beta-naphthol .....gr. 40
Sulphur, sublimed .....dr. 1
Oil eucalyptus .....dr. 1
Zinc oxid ointment.....oz. 1

—Shoemaker.

Sulphur sometimes proves decidedly irritating to the skin, especially when there is already an eczematous tendency. In

such cases some substitute must be used, as beta-naphthol or styrax.

Beta-naphthol .....gr. 40
Lard .....oz. 1

Or—

Styrax .....oz. ½—1
Lard .....oz. 1½

SCARLATINA; SCARLET FEVER; SCARLET RASH.

DEFINITION.—An acute contagious disease characterized by sore throat, a diffuse scarlet eruption of the skin, subsequent desquamation and a tendency to acute nephritis.

ETIOLOGY.—Scarlet fever may occur in adults, but is much more common in children. It has been estimated that 90 per cent of the cases occur before the tenth year. Nursing infants usually escape. The disease is caused by a specific microbe, the diplococcus scarlatinae, which was described by W. J. Class of Chicago in 1899. Infection is transmitted chiefly by the desquamated scales of epithelium, though it may be contracted from exhalations during any stage of the disease. In most cases it is probable that the germs enter the body through the respiratory tract, but it is pretty clearly shown that milk has conveyed the poison by way of the digestive tract. The bacteria are very tenacious of life. They may be carried in the clothing, hair or beard, or may maintain their vitality for months or years in carpets, rugs, books, etc. Thompson estimates that two-thirds of the cases are contracted in the schools. One attack usually confers immunity. The susceptibility to the disease is not so great as to measles, non-immune persons often escaping when other members of the same family are attacked.

PATHOLOGY.—The morbid changes in an uncomplicated case of scarlet fever are not very marked. The eruption usually disappears after death; but in malignant cases, where the rash was delayed, it may sometimes be seen post-mortem, thereby verifying the diagnosis. The eruption is caused by dilation of the blood-vessels and lymphatics in the skin and infiltration of leukocytes into the papillary layer and rete. It is really a dermatitis, producing extensive changes in the corium. Ac-

cording to Schamberg, the greatest degree of inflammation is exhibited about the hair-follicles, which are often destroyed by the process. The same author calls attention to the frequency with which vesicles occur; these, he thinks, are much more common than is ordinarily believed, being overlooked on account of their minute size. The amount of desquamation is proportionate to the degree of vesiculation.

The throat is nearly always found to be inflamed. The degree varies from a slight hyperemia to a malignant, phlegmonous tonsillitis. Sometimes there is a pseudo-membrane; this may or may not be diphtheritic. Acute desquamative nephritis produces its characteristic changes. As compared with measles, which has a selective action upon the mucous membranes, scarlatina shows a special tendency to attack the serous membranes. Endocarditis, pericarditis, meningitis and peritonitis sometimes occur. There are often fatty changes in the muscles and viscera.

Symptoms.—The *period of incubation* varies from two to seven days; rarely the first symptoms of the disease may appear within twenty-four hours after exposure; the average is three or four days. It commences abruptly, usually with nausea and vomiting; in older patients with chilliness, or in younger ones with convulsions. There is marked elevation of temperature (103° to 105° F.), and a hard, very rapid pulse (130 to 160). The patient complains of sore throat. This is usually a catarrhal inflammation of the pharynx, but often takes the type of follicular tonsillitis. The tongue is at first red at the tip and sides and its dorsum heavily coated. In a day or two the coating is partially shed and the inflamed papillæ stand out prominently presenting the characteristic appearance known as "strawberry tongue."

Within twelve to twenty-four hours after the inception of the symptoms the *rash* makes its appearance, first, in most cases, upon the upper portion of the chest and neck; sometimes it comes out first upon the thighs or back, especially if the child has been kept warm in bed. It rapidly spreads over the body, being most intense at the inner surfaces of the joints and upon the portions of the body which are kept the warmest. Examination shows the eruption to be made up of a multitude of

minute papules, each surrounded by a reddened zone in such a way as to give the entire skin a diffuse scarlet color. The process, however varies greatly in intensity. In the mildest cases the hyperemic points, though very numerous, are fairly discrete, being surrounded by small areas of normally colored skin; in cases of moderate severity the surface is of a uniform lobster-red; more rarely, patches of skin only are attacked, intervening portions being unaffected. The color disappears upon pressure and the finger nail passed lightly over the skin leaves a whitish line, lasting a moment; this is considered characteristic. There is a sensation of heat and burning, but little itching.

The papules are often tipped with minute vesicles (scarlatina miliaris). Schamberg thinks this is much more common than is usually thought. In severe cases there may be petechiae or extravasations of blood into the skin (scarlatina petechialis). In very rare cases the eruption may be entirely absent. The author recalls a case of this kind in which there was a very severe scarlatinal angina but no skin symptoms of the disease. Two other children in the same family had typical attacks. The rash usually lasts five or six days and is followed by the period of desquamation. The extent and character of this depends upon the severity of the eruption. In mild cases there is simply an exfoliation of bran-like scales; in severe cases large shreds of epidermis are shed. Sometimes these make finger-like or glove-like casts.

Throughout the acute stage of the disease the temperature remains high; the rapidity of the pulse is out of proportion to the severity of the symptoms. There is proportionate thirst, restlessness, insomnia, often delirium and sometimes convulsions. The urine is scanty and occasionally suppressed.

Scarlatinal sore throat is sometimes so severe as to give a distinct clinical type to the disease (scarlatina anginosa). In most cases patches of yellowish membrane are found upon the inflamed tonsils and pharynx. In severe cases this assumes the appearance of a false membrane, but is, however, readily removed. The throat may become fearfully swollen and abscesses form in the tonsils, or the mucous membrane may become gangrenous and extensive destruction of tissue follow.

These symptoms are due to infection with streptococci. The Klebs-Loeffler bacillus is sometimes present. Anginose scarlatina is a very grave disease. Death may result from sepsis or from hemorrhage, due to ulceration of the important arteries of the neck. The inflammation is extremely likely to reach the ear through the Eustachian tube, causing serious ear complications.

Malignant Scarlatina.—The symptoms are all intensified. The system is overwhelmed with the poison. The onset is very abrupt and the temperature at once goes very high (106° to (108° F). The pulse is rapid and weak, there are delirium, sometimes convulsions, stupor, coma and finally death. The course is rapid and the end often comes before the rash has appeared.

In the *hemorrhagic form* there is a disorganization of the blood, due to the toxemia, and extravasation into the skin and mucous membranes. There may be vomiting of blood, nosebleed or other hemorrhages. Prostration is very great and death takes place in two or three days.

COMPLICATIONS.—The most common and most dreaded of the complications of scarlatina is *acute nephritis.* This usually appears during the desquamative period of the disease, from the second to the fourth week. It is as likely to occur in the mild cases as in the severe. The crippling of the kidney by an associated renal catarrh, the presence of toxins in the blood requiring elimination and the increased work thrown upon the organ by the impairment of the function of the skin are probably responsible for its production.

Some *glandular enlargement* is present in nearly every case. This may proceed to suppuration and produce extensive destruction of important structures.

Otitis media is a frequent complication of the disease. It is usually suppurative, due to streptococcus infection through the Eustachian tube, and may result in permanent deafness. It may appear during the eruptive or desquamative stage.

Scarlatinal rheumatism occurs in a large number of cases (7 per cent—Anders). Its symptoms are similar to those of acute rheumatism, but it is in all probability caused by the specific germ of scarlatina.

Among other complications are meningitis, pericarditis, endocarditis and various nervous affections, including chorea, convulsions, paralyses, hemiplegia, etc.

DIAGNOSIS.—The strawberry tongue, the high temperature with disproportionate rapidity of the pulse, the sore throat, the punctiform character of the eruption and the desquamation which follows, are sufficient to differentiate from the rashes which follow the administration of belladonna, quinin, acetanilid and other drugs, or the transient erythemas due to indigestion. It is more likely to be confused with measles or German measles. (For differential diagnosis see the table under Measles.)

In cases in which the throat symptoms are the most prominent, scarlatina may be very easily mistaken for diphtheria, but in the latter disease there is usually no eruption, no strawberry tongue, prostration is greater and microscopical examination shows the presence of the Klebs-Loeffler bacillus. It should not be forgotten that the two diseases may coexist.

PROGNOSIS.—The mortality varies greatly in different epidemics, ranging from 5 to 30 per cent. The tendency of uncomplicated cases is to recovery. Nephritis is a very serious complication, still, most of the patients who contract it get well. Cardiac complications are always to be dreaded. The malignant forms of the disease usually terminate in death.

TREATMENT.—*Prophylaxis.*—If the nature of the disease is recognized before the appearance of the eruption it is often possible, by proper care, to prevent other members of the family from being attacked. The patient should be placed in a well-ventilated, evenly warmed room, remote from the rest of the house if this is possible. All rugs, carpets, upholstered furniture, books, pictures and other articles not actually needed in the care of the patient should be removed before he enters it. The doorway to the room should be hung on the outer side with a sheet which is kept moistened with an antiseptic solution, as formalin or mercury bichlorid. The door should be kept closed and the patient put in charge of a nurse who should communicate as little as possible with the members of the family. In going and coming the physician should exercise great care that he may not be the source of infection to other children. It is a good plan to wear into the sick-room a cotton gown or

linen duster which has been washed in an antiseptic solution and then dried. The hands should, of course, be bathed with antiseptics and special care taken that the beard does not become a carrier of the germs.

In order to prevent the flying of the scales the skin should be frequently anointed with vaselin, cacao butter, lanolin, olive, almond, or some other bland oil. This has also distinct therapeutic value which may be increased by combination of the oily substance with antiseptics and antipruritics. When there is marked burning and itching of the skin great relief is obtained by first sponging with soda or borax and water. Carbolized vaselin, borated vaselin, or one of the following will meet the indications:

Carbolic acid ..... dr. 1
Eucalyptus oil ..... dr. 1
Olive oil ..... oz. 6

Apply every two or three hours.—J. Lewis Smith.

Thymol ..... gr. 10
Alcohol, to dissolve.
Cacao butter ..... oz. 1

Apply several times daily.—Hatfield.

Seibert praises a 5 to 10 per cent ointment of ichthyol in glycerin. He claims that it not only prevents the flying of the scales but makes them less infectious, at the same time relieving the itching and edema, preventing fissures and secondary erysipelatous infections, reducing the temperature and decreasing restlessness, insomnia and the danger of nephritis. Williams prefers a mixture of 1 part glycerin to 7 parts hydrogen dioxid. He claims that it is adhesive enough to prevent the dissemination of scales, restores the skin quickly to its normal condition and shortens the period of desquamation.

Smith also recommends that some pleasant antiseptic be volatilized in the room. The following is recommended, two teaspoonfuls being placed in a dish of water and kept simmering on the stove, or over a gas burner or alcohol lamp:

Carbolic acid ..... oz. 1
Oil eucalyptus ..... oz. 1
Spt. turpentine ..... oz. 6

The patient should be kept in quarantine as long as "peeling" continues. Probably six weeks is a fair average. Before he is

allowed to meet other children he should have a full bath and a complete change of clothing.

Hygienic and Dietetic.—The great danger of kidney complications makes special care to avoid exposure to cold important and drafts of cold air necessary. Caution should particularly be observed during convalescence. Milk is the best article of diet; indeed, it has been asserted than an exclusive milk diet is the best prophylactic for nephritis. Certainly no food should be given which will require additional work of the kidneys. Jellies, light broths, oranges, lemons and other juicy acid fruits are permissible and palatable. The patient should be encouraged to drink plenty of pure water. The urine should be frequently examined.

Medicinal Treatment.—Little treatment is required in an ordinary case of scarlatina. The patient should be watched closely in order to recognize complications or to forestall them. If the bowels are constipated a mild mercurial may be given at the first call. If there is also nausea the drug should be given in small frequently repeated doses. This usually quiets the stomach. Calomel is the most useful form; it may be administered as follows:

Calomel .....gr. 3
Sodium bicarbonate .....gr. 12
Bismuth subnitrate .....dr. ½
Make 12 powders. One every hour for several doses.

In addition to calomel and bismuth, lime-water, carbonated waters and cracked ice will be found useful for the alleviation of the symptom.

There is no specific for scarlatina, though various authors have recommended the use of internal antiseptics. Among these are the sulphocarbolates of zinc and sodium, the syrup of phenic acid, salicylic acid and the salicylates. These are undoubtedly valuable in many cases, probably on account of their antipyretic action and their deodorant effect upon the stools; perhaps by preventing decomposition of the latter they decrease the severity of the symptoms and prevent the development of kidney complications, due to the absorption and elimination of intestinal toxins. T. E. Walton (Pediatrics) believes that a daily dose of salicylic acid (1½ to 4 grains, according to

age) actually prevents the development of the disease if administered early enough, and that its use in small doses during the course of the disease renders it decidedly more mild. The following is a suitable formula:

Salicylic acid .....gr. 48
Water .....dr. 2
Syrup orange, enough to make.....oz. 3
Teaspoonful every one to three hours.

It should not be forgotten that carbolic acid and its derivatives are sometimes irritant to the kidneys.

Chloral hydrate is one of the favorite drugs. It is indicated in cases attended by considerable restlessness and nervous excitement. It should be given in doses sufficiently large to quiet the patient and produce natural sleep; it should never be pushed to the point of stupor. The dose usually ranges from 1 to 2 grains for a child two or three years old, to 5 grains for children approaching puberty; the indicated quantity should be given every two or three hours, according to its effects. The following formulas may be tried:

Chloral hydrate .....dr. ½
Syr. lactucarium (Aubergier).....oz. ½
Water .....oz. ½
A teaspoonful in iced water every two to four hours.

Hatfield combines it with digitalis in the following:

Chloral hydrate .....dr. 1—2
Infusion digitalis .....oz. 1
Syr. raspberry .....oz. 3
Teaspoonful every two or three hours, with increased dose for sleep at night.

For the fever, aconite and veratrum viride in small, repeated doses, are often prescribed with benefit, both reducing the tension of the pulse and moistening the skin. The best treatment is by the external use of water, as later recommended. Acetanilid, phenacetin, lactophenin and other coal-tar antipyretics may be cautiously used, especially if the fever is not reduced by the cold sponging. A good rule for giving acetanilid is to make the dose one-third the age, that is, if the child is three years old the dose would be one grain, etc.

According to Solomon (Phila. Med. Jour.) acetanilid is useful for relieving headache and joint pains, but phenacetin is

better if there is much muscular pain. If the pulse shows high arterial tension antipyrin is to be prescribed. Acetanilid acts the most rapidly; lactophenin is least depressing. It is advisable to combine drugs of this class with tonics, as strychnin, quinin, or caffein. The following formula is suggested:

Antipyrin	gr. 16—30
Spt. ammon. arom.	dr. ½—1
Syrup raspberry	oz. 1
Cinnamon water, enough to make	oz. 2

Teaspoonful every two to three hours to child two years old.

If the eruption is slow in making its appearance it should be encouraged by the use of heat and stimulating applications to the skin. A hot foot bath, a hot bath or a hot pack will usually prove effective. The addition of a little powdered mustard to the water will lend efficiency to the measure.

When there is great bodily depression, stimulants are required. Whisky or brandy may be given in full doses, or ammonium carbonate, aromatic spirits of ammonia, or coffee. A useful heart stimulant recommended in Gould's Cyclopedia is:

Tinct. camphor	oz. 1
Tinct. musk	oz. 1

One-half to one teaspoonful every two hours.

Strychnin, nitroglycerin and digitalis may also be administered, either hypodermically or by the mouth. A hypodermic of camphorated oil makes a quickly acting and efficient cardiac stimulant.

Hydrotherapy is of the greatest importance. Internally, water serves to flush the kidneys of accumulating toxins. A bath or sponge with warm water should be given daily and followed by the inunction. To reduce the fever the surface of the body should be sponged with cold water when the temperature reaches 102° F. or more. If the fever is high the general bath is to be tried. Some authors recommend the cold bath, the temperature of the water being reduced to 70° F., or even less. This is seldom practicable in private practice in this country, moreover the shock is often great to a sensitive child. It is better to place the patient in water having a temperature of about 100° F.; this may be gradually reduced to about 80° F. An ice bag should be placed upon the head or cold water poured upon the head and shoulders. In lieu of this the cold pack may

be tried, the patient being wrapped in sheets wrung out of cold water; if the child does not react well the water may at first be tepid and then gradually reduced in temperature. Friction should be used with cold applications. Practically, the cold sponging is all that is generally required, but in malignant cases where the temperature runs very high the physician should insist upon the thorough use of the more vigorous measures. The addition of a little alcohol or vinegar to the water with which the child is sponged is a harmless concession to popular prejudice.

The *sore throat* requires special attention. An ice bag or iced compresses may be applied externally. Astringent and antiseptic sprays and gargles are to be used. An old and popular formula is the following:

Potassium chlorate	dr. ½
Tinct. iron chlorid	dr. 2
Syrup	oz. 1
Water, enough to make	oz. 4

Potassium chlorate is, however, irritant to the kidneys and should not be swallowed. In young children, and often in the older ones, the atomized spray is the most effective. Dobell's solution, listerine, glyco-thymoline and similar preparations are useful. One of the best is hydrogen dioxid, diluted with one or two volumes of water to which a little glycerin may be added. The nasal cavities should also be kept clean in the same manner in order to diminish the probability of extension to the ear. An oily spray of menthol (5 to 10 grains to the ounce of liquid petrolatum) may profitably follow the cleansing spray. Where there are foul and offensive exudations Smith recommends painting the throat with the following:

Carbolic acid	gtt. 10
Sol. iron subsulphate	dr. 2
Glycerin	dr. 1

Otitis should be treated as when due to other causes, by the application of external heat, irrigation with hot water, etc., for the relief of pain, and early paracentesis when pus has appeared.

To prevent *nephritis* the urine should be collected, measured and examined every day. If albumin is found the child should be placed upon a milk diet, an abundance of water given;

should be kept in bed and a diuretic mixture prescribed. A cream of tartar lemonade is a palatable remedy. Citrate of potassium may also be taken with lemonade. Useful formulas are:

Potassium bitartrate	dr. 1
Spt. juniper comp	dr. 2
Spt. nitrous ether	dr. 1
Tinct. digitalis	m. 15
Syrup	dr. 5
Water, enough to make	oz. 2

Teaspoonful every three to four hours.—Meigs and Pepper.

Tinct. digitalis	dr. ½
Sol. ammonium acetate	oz. 1½
Spt. nitrous ether	dr. 2
Syrup tolu	oz. ½
Caraway water, enough to make	oz. 3

Teaspoonful every two hours for a child of eight years.—Goodhart and Starr.

If dropsy develops these or other diuretics should be continued and sweating encouraged by the hot pack or a hot water bath, or, if the patient is robust, by the use of pilocarpin. The bowels should be emptied by a quickly acting and vigorous cathartic. Enteroclysis is sometimes found expedient. (See Nephritis for further details of treatment.)

SCIATICA.

DEFINITION.—A painful affection of the sciatic nerve. It may be either a neuralgia or a neuritis.

ETIOLOGY.—Sciatica is much more frequent in men than in women. Predisposing causes are the lithemic or rheumatic diathesis, diabetes and some of the infections. An attack is usually excited by exposure to the cold or damp or by injuries to the nerve somewhere in its course by blows, falls, contusions, lifting, fractures, the pressure of tumors, etc. Constipation, diseases of the rectum, uterus and ovaries or pelvic inflammations may cause it.

PATHOLOGY.—Morbid changes are frequently slight or absent. In the neurotic variety the nerve and its sheath are red and swollen.

SYMPTOMS.—The prominent symptom is the pain which is constant with severe paroxysms, when it is sharp and lancinating.

It is increased by motion. It is often referred to the entire distribution of the nerve, from the region of the hip, along the posterior aspect of the thigh to the calf of the leg and sole of the foot. At other times it may be felt through a part of this course only. The pain may be sudden in its onset or gradual. In the former case it may be so intense that the patient is unable to stand and falls down at the beginning of the attack.

There is marked tenderness along the course of the nerve. This is more intense at certain points, notably at the sciatic notch where it emerges from the pelvis, the middle of the posterior aspect of the thigh, the popliteal space, the middle of the calf of the leg, behind the external malleolus and the dorsum of the foot.

In standing the patient favors the affected part. The trunk is inclined toward this side and he steps on the toes, keeping the knee flexed. There may be sensory disturbances, as numbness, formication, etc. Sometimes there is an herpetic eruption. If prolonged the disease may cause muscular atrophy. In severe cases there may be, during the acute stage, some febrile reaction.

Diagnosis.—The diagnosis seldom causes difficulty. The "lightning pains" of tabes are usually bilateral; sciatica is unilateral.

Hip-joint disease is most painful over the trochanter, and physical examination shows the characteristic restriction of motion.

Prognosis.—There is little danger as regards life, but the disease is often intractable and prone to relapse. Prolonged cases may cause marked debility on account of the constant suffering. Six or eight weeks is the usual length of an attack but the disease may last as many months.

Treatment.—During the acute stage of the disease the patient should be kept absolutely quiet in bed, and in many cases it is advisable to put the limb in a splint. Hydrotherapy is valuable at this period. Either hot or cold applications may be made. Sneve (St. Paul Med. Jour.) recommends the Priessnitz bandage, which consists of a roll of muslin, soaked in cold water and applied to the limb. Over this a heavy coating of

flannel is applied, the whole being left in place twelve hours at a time. Hunt (Ill. Med. Jour.) has had gratifying success with extension by means of the ordinary Hodgen's splint. This consists of an ordinary bar of iron, bent so as to extend on either side of the leg from the sole to the hip joint. The limb is suspended from this apparatus by strips of bandage passing from side to side beneath the limb and made fast by lateral strips of adhesive plaster secured by a circular roller. The limb is suspended by a pulley from the ceiling or a suitable frame, and extension made. Dr. Hunt has treated nearly sixty cases in this way without a failure. Relief to the pain is almost immediate and a cure is made in two or three weeks.

Medicinal treatment is practically the same as of neuralgic pains elsewhere. Rheumatic patients should be given the salicylates or the iodids, syphilitics mercury or the iodids, and malarial ones quinin. Phenacetin and antipyrin are useful for the relief of pain. If this is very severe it may be necessary to resort to morphin but this should be avoided if possible.

In addition to the hydrotherapeutic measures already alluded to various local applications may be tried, including hot baths, mustard paste, linseed poultices, blisters, the Paquelin cautery, wet and dry cups, acupuncture and deep injections of cocain, chloroform, antipyrin, etc. Thompson recommends the following liniment:

Menthol	dr. 2
Chloral	dr. 2
Camphor water	oz. 3
Alcohol	oz. 3

Ichthyol has been used internally and externally with good results:

Ichthyol	gm. 50
Glycerin	gm. 20
Distilled water	gm. 30

In intractable cases stretching of the sciatic nerve is often decidedly beneficial. This is performed as follows: With the patient in the reclining position, the physician slowly flexes the thigh upon the trunk, the leg being held extended until the patient cries out with pain. This is followed by passive motion of the limb and massage throughout its entire length, following the course of the nerve.

Electricity is sometimes decidedly beneficial. Counter-irritation may be made with the faradic or static current. This helps to relieve the pain.

SCORBUTUS; SCURVY.

DEFINITION.—A nutritional disease caused by an unsuitable diet and characterized by swollen, spongy gums and a tendency to cutaneous, mucous and subperiosteal hemorrhages.

ETIOLOGY.—The disease may occur at any age. Formerly it was supposed to be confined to adults but it is now known to be very frequent in young infants. Scurvy was once very common on ship-board, in armies and in institutions where fresh food was lacking and there was a monotony of diet. It is now of infrequent occurrence in this country, except among young children who are fed on artificial foods or condensed or sterilized milk. Breast-fed babies do not contract the disease.

Scurvy is produced in adults mainly by deprivation of fresh fruits and vegetables, also by a diet of salted or tainted meats, an excess of fats or insufficient food. Debilitated or cachectic states favor its occurrence. Just how this change of diet causes the disease is not understood. It has been observed that there is a deficiency of the potassium salts in the blood and these are derived largely from the fruits and vegetables. Some consider it a ptomain poisoning, but fail to explain why Esquimaux and other races can live on a diet of fat and tainted meats exclusively and remain immune. It is also claimed that the disease is infective and different bacteria have been described. Horne (Lancet) believes that these microorganisms, which infest the intestinal canal, excite a gingivitis and that they are destroyed by the lime juice used in treatment.

PATHOLOGY.—Examination of the blood shows a reduction of the number of red corpuscles and an equal reduction in the quantity of hemoglobin. There is no leukocytosis. The most marked changes are in the mouth, the gums being swollen, spongy and sometimes ulcerated, the teeth rarely falling out. Hemorrhages are frequent; there may be ecchymotic spots in the skin, submucous hemorrhages, bleedings into the muscles, joints, viscera, and serous membranes of the peritoneum, pleura, etc. Subperiosteal hemorrhages are most common in children,

producing nodular enlargements and thickening, with swelling and sometimes separation of the epiphyses of the long bones. The spleen is enlarged and soft, and the heart, liver and kidneys may undergo parenchymatous degeneration.

SYMPTOMS.—The symptoms develop slowly, commencing with a sense of weariness and pallor of the skin. The most marked symptom in the adult is the swollen, spongy condition of the gums, which often bleed upon a touch. The teeth become loose and may fall out. The breath is foul; the tongue is swollen but usually clean. There may also be ecchymoses from the mucous membrane; frequently there is nose-bleed. Diarrhea is common and the discharges may be blood-stained (scorbutic dysentery). Subcutaneous hemorrhages are of frequent occurrence and form upon slight traumatism. Sometimes there is bleeding into the muscles or joints, less frequently into the lungs or viscera; this may cause hemoptysis or hematemesis. There may be ulceration of the skin. The patient emaciates rapidly and becomes greatly debilitated.

In children the most prominent symptoms are caused by the subperiosteal hemorrhage, causing nodular swelling and great tenderness along the line of the long bones, so that the child does not like to be touched or moved, causing a pseudo-paralysis. The femurs are the bones most frequently involved. Sponginess of the gums is not so prominent a symptom as in adults. Ecchymoses of the skin and mucous membrane are sometimes, but not invariably, a late development.

DIAGNOSIS.—In a well-marked case this offers little difficulty. The history of the case, a knowledge of the patient's diet and surroundings and the characteristic spongy gums will usually distinguish it from purpura. In toothless old age the gum symptoms are less marked and the diagnosis is more difficult. Scurvy, however, responds promptly to the proper treatment.

The scurvy of children and rickets are closely allied and in some respects much alike. In the latter disease there is the box-shaped head, the "rosary," the enlarged epiphyses, and other characteristic symptoms. The pain in the limbs in scurvy is sometimes diagnosed as rheumatism. A careful examination of the long bones should eliminate this disease.

PROGNOSIS.—Under proper treatment the prognosis is good,

unless the case is far advanced, associated with exhausting hemorrhages or complicated.

TREATMENT.—The disease is readily prevented by providing fresh fruit and vegetables and fresh meat. Where this is possible, as on exploring expeditions in the Arctic, long voyages or mining or military expeditions the use of lime juice is considered an efficient prophylactic. Infants should not be kept on an exclusive diet of artificial foods or sterilized milk. A proper diet will also usually restore the patient to health. Fresh fruits or fruit juices, lemonade, liberal quantities of vegetables, fresh meat, beef-juice, fresh milk, eggs, etc., are to be permitted, the quantity and variety being adapted to the patient's digestion. Orange-juice, beef-juice and fresh milk will rapidly restore the child to health. The surroundings should, of course, be good. Astringent gargles, containing alum, potassium chlorate, etc., are indicated for the sore mouth. Ulcers or bleeding points may be touched with a weak solution of silver nitrate.

SEPTICEMIA AND PYEMIA; BLOOD POISONING.

DEFINITION.—Septicemia is an infective disease caused by the presence in the blood of septic bacteria or their products. In pyemia there are, also, secondary foci of infection, or abscesses, produced by the deposit in the tissues at various points of the pus microbes carried by the blood.

ETIOLOGY.—Though many disease-producing bacteria (as the gonococcus, bacillus typhosus, etc.) may produce a septicemia, the term is usually restricted to the disease resulting from the presence of the pus microbes (streptococci or staphylococci) or their toxins in the blood. In the former case it is called a septic infection; in the latter, septic intoxication. The most severe infections are produced by streptococci. The term *sapremia* is applied to a mild form of sepsis, usually a ptomain poisoning, caused by absorption of poisons from decomposing animal matter.

The germs may gain access to the blood through the uterus, following childbirth or abortion; through infection of wounds, or by way or sores, erosions or abrasions of the skin or mucous membranes. Uterine septicemia is commonly called puerperal fever.

In pyemia a vein or veins in the neighborhood of a suppurative focus become infected, the bacteria find their way through its wall, a thrombus is formed which becomes the seat of purulent infection and this is finally set free in the blood stream as an embolus and is carried with the infecting germs to different portions of the body, finally becoming lodged in the tissues, thereby producing secondary or metastatic abscesses. These pyemic abscesses may be formed anywhere in the body, but are most frequent in the lungs, liver, spleen and kidneys.

Symptoms.—In mild cases of septic intoxication, or sapremia, the symptoms usually commence suddenly with a chill or chilliness, followed by a sharp rise of temperature (101° to 104° F.), rapid pulse, frequently nausea or vomiting, sometimes diarrhea, headache and marked prostration. Sapremia sometimes follows childbirth as a result of retention of secundines, or it may be due to absorption of putrefactive matter from the intestinal tract (blood poisoning). The symptoms rapidly subside if the cause is removed.

In true septicemia the symptoms are more intense and overwhelming. They usually make their appearance within two or three days after infection. There is a severe chill and the temperature goes up with a bound. Within a few hours it is 104° to 105° F. The pulse is very rapid and soon becomes feeble and thready. Respiration is hurried and shallow. There is severe headache, loss of appetite, frequently vomiting and diarrhea. The face becomes drawn, sharpened and anxious, the patient soon lapses into a condition of mental stupor, later there is mild delirium. Prostration is profound. The fever continues high, there is profuse perspiration, the mouth becomes dry and the tongue brown and tremulous. Death frequently takes place within four or five days.

Sometimes the disease takes on a more chronic type, being characterized by frequent chills, intermittent or remittent fever of an irregular type and profuse sweating. These symptoms indicate the continuance of the suppurative process and the absorption of pus. This is characteristic of pyemia. In addition there are the usual symptoms of the associated septicemia and the local symptoms of abscess in the affected organ or organs.

An important symptom in pus infections of any kind is leukocytosis, or an increase in the number of leukocytes. This is practically always present in every case of septicemia or pyemia.

DIAGNOSIS.—In most cases the history of the case, as to confinement, abortion or the presence of a suppurating wound, leaves little doubt as to the diagnosis. Chronic cases offer the most difficulty.

In typhoid fever, there is the characteristic temperature curve, the presence of the rose-spots on the abdomen, Widal's test and the absence of leukocytosis.

In malaria the recurrence of chills and fever is usually more regularly periodic, the plasmodium malariæ may be demonstrated in the blood, the spleen is larger than in septicemia, leukocytosis is slight or absent and the patient is benefited by quinin.

Miliary tuberculosis is sometimes differentiated with difficulty, especially if there is mixed infection. The demonstration of tubercle bacilli or reaction to the tuberculin test clears up the diagnosis.

PROGNOSIS.—Sapremia is seldom fatal, but in true septicemia or pyemia the prognosis is very grave. While cases of recovery are not infrequent, the termination is too often in death. The most hopeful cases are those in which the location of the infecting focus makes its removal possible.

TREATMENT.—An effort should be made to eradicate the cause, when this seems possible. Thorough evacuation of the bowels with saline laxatives and enemas and the administration of intestinal antiseptics is indicated if there is any reason to believe the condition due to ptomain poisoning. All wounds should be thoroughly cleansed and drained. The uterus should be examined and any fragments of membranes or placenta removed with the dull curette and the cavity irrigated with an antiseptic solution. Opinions differ as to the wisdom of curetting a puerperal uterus, but it is usually advised. If done, great care should be exercised that there is no unnecessary destruction of endometrial tissue, thereby removing the natural barriers against infection. After curetting, the cavity should be irrigated and its internal surface painted with iodized phenol.

The medicinal treatment is mainly supportive. Quinin, strychnin, ammonium carbonate and whiskey or brandy are administered according to indications. The bowels should be regulated by laxatives or guarded by opium if there is diarrhea. Mild diuretics help to maintain the activity of the kidneys. Fever is best controlled by cold sponging. All depressing drugs are contra-indicated. A milk diet is the best.

Specific medication has not been very successful. The anti-streptococcus serum has been used quite largely, and while in some cases it has produced apparently good results, the consensus of opinion seems to be that it is of little value. Some have reported favorably from the use of Crédé's soluble silver salt (unguentum Crédé) in septicemia. About a dram of the ointment is rubbed in daily, in different portions of the body.

SHINGLES—*See* Herpes Zoster.

SMALLPOX—*See* Variola.

SORE THROAT—*See* Pharyngitis and Laryngitis.

STINGS AND BITES.

TREATMENT.—During the summer months the bites of animals and the stings of insects become more frequent. The bite of the dog is often dreaded on account of the possible danger of rabies. While this is seldom to be feared, some care in dressing the wound is advisable. Usually slight enlargement of the wound so that it will bleed freely, thorough cleansing with soap and water and irrigation with an antiseptic solution, as bichlorid, potassium permanganate, sodium hyposulphite or even salt solution is all that is necessary. If any suspicion exists that the animal is rabid the wound should be cauterized with caustic potash or fuming nitric acid. The dog should not be killed, but should be closely confined and watched to see if it develops symptoms of rabies. If this occurs or there is other proof of hydrophobia the patient should be sent to the nearest Pasteur institute.

In case of a bite by a venomous snake, a ligature should be placed about the limb above the bite, so as to permit the venom

to enter the body as slowly as possible. If the wound is on the body excise or cauterize it. Stimulants are often required to maintain the action of the heart, if it shows signs of weakness, but not in excessive quantities. Alcohol, strychnin, ammonia and coffee are useful in judicious quantities. One writer recommends giving whisky until its effects are felt, then the following:

Ext. jaborandi .....oz. 1
Ext. gelsemium .....dr. 1
Glycerin .....oz. 1
Water, enough to make.....oz. 4

Teaspoonful every hour until sweating occurs, then less often.

The poison should be removed from the wound, as far as possible, by sucking or the application of cups. Any of the following are injected into the bite and its immediate neighborhood:

Potassium permanganate .....gr. 8
Distilled water .....oz. 1

Or—

Calcium hypochlorite.....gr. 8
Distilled water .....oz. 1

Or—

Tincture iodin .....oz. 1

Inject hypodermically and scrub out the wound.

Calmette's *antivenene* is a serum which has been used quite extensively in India with alleged good results.

Investigations concerning the etiology of malaria and yellow fever show that the bite of the mosquito is never to be thought lightly of. All houses in malarial districts should be screened and the insects destroyed within doors by burning sulphur or insect powder. Petroleum applied to stagnant water prevents the larvae from hatching out and kills many of the insects. Washing the skin with a weak lotion of carbolic acid or an alcoholic solution of oil of pennyroyal, or applications of oil of tar helps to keep them away. The following is recommended as a prophylactic:

Oil tar .....oz. 1
Olive oil .....oz. 1
Oil pennyroyal .....oz. ½
Spt. camphor .....oz. ½
Carbolic acid dr.2

To be applied occasionally.

After the skin has been bitten, ammonia water, spirit of camphor, or lead water and laudanum may be applied. The following, applied at once, will often prevent inflammation:

Salicylic acid .....gr. 24
Collodion, elastic .....oz. ½

Ichthyol is also a useful remedy. It may be used in the form of ointment, lotion, added to the collodion lotion given above, or in the following:

Ichthyol .....dr. 4
Ammonia water .....dr. 4
Camphor water .....oz. 4

Most of these applications are also useful in case of stings by wasps and bees. Sometimes immersing the part in cold water or the application of a cold paste made of ordinary soda will prove effective. The kaolin pastes, as antiphlogistine, should be useful in these cases. Camphor-chloral will usually arrest the pain.

STOMACH, DISEASES OF—See Gastric Neuroses, Gastritis, Gastric Dilation, etc.

SUNSTROKE—See Heatstroke.

SUPRARENAL DISEASE—See Addison's Disease.

SWEATING, EXCESSIVE OR OFFENSIVE.

ETIOLOGY.—Excessive sweating (hyperidrosis) may be caused by general debility or may be due to disturbances of the sympathetic or central nervous supply. It may be local or general. The feet, hands, scalp and axillae are especially likely to perspire freely. It is also a symptom in certain general diseases, such as tuberculosis, rheumatism, septicemia and intermittent fever, and it may be caused by the use of alcohol, drinking too freely of ice-water, etc.

Bromidrosis (offensive sweating) is frequently associated with hyperidrosis. The secretion undergoes decomposition, making it extremely offensive or fetid in smell. This is probably due to its infection with micro-organisms.

TREATMENT.—The general health should be looked after. Sometimes general tonic medication with strychnin, iron, phosphorus, arsenic, etc., is needed. Belladonna, agaricin, camphoric

acid, ergot, etc., are sometimes used internally, but are not indicated in ordinary cases of hyperidrosis. Crocker recommends sulphur internally in dram doses twice daily.

The skin should be kept clean by frequent bathing with soap and warm water and systemic tone obtained by the daily cold shower or sponge bath with friction. Excessive or offensive sweating of the feet, hands and axillae is most likely to suggest the necessity of treatment. Dusting powders containing salicylic acid, boric acid, starch, talcum and lycopodium are favorite applications to the feet. The powder is usually dusted into the stockings or shoes. Some prefer astringent lotions containing alum, tannic acid, zinc sulphate, potassium permanganate, formalin, and alcohol. Lotions are more satisfactory for use upon the hands, the axillae and exposed surfaces of the body. Ointments are also sometimes used in these localities. Following are formulas:

Salicylic acid	gr. 10—20
Boric acid	dr. 2
Eucalyptol	dr. 5
Powdered starch	dr. 6

Use as a dusting powder.

Or—

Powdered rice	oz. 2
Bismuth subnitrate	dr. 7
Potassium permanganate	dr. 3
Powdered talc	dr. 1½

To be dusted upon the parts.—College and Clin. Record.

Adler warmly recommends tannoform, especially on the interdigital folds, and in inflammatory conditions of the skin, while he prefers formalin on the thickened skin of the soles. The two drugs can be used together. The following is good:

Tannoform	dr. 1½
Powd. orris root	dr. 1
Salicylic acid	gr. 15
Powd. talc	dr. 3

Use as a dusting powder.

Or—

Mercuric chlorid	gr. 1
Alcohol	oz. 8
Rose water	oz. 8

Or—

Zinc sulphate	gr. 20
Boric acid	gr. 40
Alcohol	oz. 1
Water	oz. 3

Formalin has recently become very popular in the treatment of excessive and offensive sweating. Solutions of varying strength, from the concentrated down, are applied to the skin. Gerdeck (Deutsch. Militär Zeitschr.) used it as follows in the German army:

In the morning, midday, evening, and the following morning, the skin of the sole of foot and heels is painted with official formalin (by means of a brush, with a long handle for the protection of the hands), using for the whole process, at an average, 2½ drams of formalin. The skin of the toes on the extensor side, and intervening folds of toes, should only be painted twice, in order to avoid on this tender skin cracks of the epidermis. The sweat secretion ceases mostly after the third, always after the fourth painting. The disagreeable odor disappears, the skin is hardened and dry. If disagreeable odor or secretion is still present between the toes, painting once or twice with a 10-per-cent solution of formalin will be found sufficient to remove it. When this treatment is completed, the boots of the patient should be disinfected by dropping into each boot four to six drops of concentrated formalin. About three weeks after the painting has been discontinued, slight secretion of sweat will be noticed, which increases gradually. Two or three months after a relapse takes place, which, however, seems to be milder than the first attack. If weaker formalin solutions are used, the painting should be done more frequently. The deodorizing action can even be observed with a 3-per-cent solution, but only from a 5-per-cent solution secretion is influenced.

Ravogli recommends the following:

Formalin	dr. 1-2
Glycerin	dr. 2
Cologne water	oz. 2
Alcohol	oz. 3

Leistikow uses it in the form of an ointment:

Formalin	dr. ½-1
Lanolin	dr. 2
Vaselin	oz. ½

To be thoroughly rubbed in at bedtime.

Hebra applies diachylon ointment to the feet, thickly spread on strips of muslin. This is continued for ten to twenty days, the feet being dried and the dressings being reapplied daily. At the end of this period a new epidermis is formed and the feet are washed for the first time. Other ointments may be used in the same way.

Leistikow thinks hot baths, with stimulant applications, such as spirit of comphor or turpentine in an ointment indicated in cold sweating; in hot sweating he reduces the hyperemia by astringent lotions.

Hot water applied to the axillæ on a sponge will temporarily relieve excessive sweating from that locality.

SYCOSIS; FOLLICULITIS BARBAE.

DEFINITION.—An inflammatory disease of the skin affecting the hair follicles of the bearded region.

ETIOLOGY AND PATHOLOGY.—The cause of the disease is not clear but it is supposed to be due to infection with pus microbes which set up an inflammation of the perifollicular tissues, later of the follicle and the hair sheath, thereby causing a papular or pustular eruption, not unlike that of acne.

SYMPTOMS.—The eruption consists of papules and pustules, often mixed, and frequently situated closely together, thus making an inflamed, infiltrated and swollen area of varying size but always confined to the bearded region. Each papule or pustule is pierced by a hair; the shaft of the hair is unaffected by the disease but when the follicle becomes pustular the hair may be easily extracted, when pus will be found adherent to the root. The pustules show little tendency to rupture and often occur in crops, drying down upon the surface in yellowish to brownish scales. In acute cases there may be considerable burning and itching. The disease is extremely chronic. In some cases it causes destruction of the follicles and permanent loss of hair in the affected region.

DIAGNOSIS.—Sycosis is most likely to be confused with tinea sycosis (barber's itch). The latter disease presents marked nodules; the hairs are dry and broken, and easily removed; its course is rapid and the form and location constantly changing, and a vegetable fungus is to be found.

In eczema the inflammation of the skin is more general—it is not primarily a folliculitis as is sycosis; eczema is seldom confined to the bearded region; it presents a weeping surface if at all acute; and itching is a very prominent symptom.

PROGNOSIS.—The disease is curable but many cases resist treatment for a long time—months or even years sometimes.

TREATMENT.—Internal treatment with tonics and nutrients, such as iron, arsenic, quinin, strychnin and cod-liver oil, is useful if the physical condition of the patient is below par. Calcium sulphid (½ to 1 grain several times daily) is recommended here as in other suppurative conditions.

External treatment is of the most importance. The face should be frequently shaved or the beard clipped, first removing any hairs which pierce pustules. If the eruption shows marked inflammatory symptoms sedative applications should be made, such as cold cream, zinc ointment or boric acid solution. Ordinarily antiseptic and stimulant remedies are applied. Sulphur is a favorite and salicylic acid, ammoniated mercury, oleate of mercury, bichlorid of mercury, ichthyol, etc., are of value. The following formulas may be tried:

Precipitated sulphur	dr. ½
Ichthyol	dr. 1
Petrolatum	dr. 2
Diachylon ointment	dr. 6

Or—

Ammoniated mercury	gr. 15—30
Lanolin	dr. 4
Vaselin	dr. 4

Or—

Creosote	m. 15
Ammoniated mercury	gr. 15
Oil eucalyptus	m. 10
Zinc oxid ointment	oz. 1

—Shoemaker.

Or—

Mercuric chlorid	gr. 1
Alcohol	oz. 1
Water	oz. 3

The beard should not be allowed to grow again until some months after the disease has entirely disappeared.

SYPHILIS.

DEFINITION.—An infectious, constitutional disease, usually acquired by sexual contact or transmitted by parent to child, characterized by several distinct stages and manifesting a great multiformity of symptoms.

ETIOLOGY.—Syphilis is undoubtedly due to infection with a specific germ. The identity of such a causative germ has not yet been proven although Lustgarten has described a bacillus (1884) and others have found microorganisms in the lesions and blood of syphilitic patients which they believe stand in an etiological relation to the disease.

The disease is transmitted by coitus in the great majority of cases and the first evidences of it are usually to be found on the genitals. In the case of sexual perverts the initial lesion may be found at the anal margin, the groin, lips, tongue, tonsil, and other portions of the body. It may be acquired innocently by kissing, or contact with infected clothing, bedding, towels, drinking cups, dishes, etc. Physicians and midwives occasionally get a chancre upon the finger in making vaginal examinations, and the wet nurse may contract chancre of the nipple through suckling a syphilitic child. Wounds may be infected with the syphilitic virus and cases have been recorded in which the poison was introduced into the system through a vaccine pustule. With bovine lymph and the modern aseptic method of vaccination this is now well-nigh impossible. Syphilis is infectious during the primary and secondary stages.

Syphilis may also be hereditary. The fetus may be infected by either parent or by both. The father may transmit the infection to the child through the semen and the mother escape. In such cases the woman acquires an immunity and she can nurse her child without contracting the disease (Colles' law). On the other hand the child of syphilitic parents may be im-

mune (Profeta's law). If the fetus becomes infected it frequently dies before birth, causing abortion or miscarriage.

An attack of syphilis usually confers immunity against reinfection.

PATHOLOGY.—The initial lesion consists of round-celled infiltration, followed by erosion and ulceration with underlying sclerosis, "due in part to new-formed connective tissue and in part to epidermal thickening" (Hyde and Montgomery). There is thickening of the coats of the vessels and blocking of their lumens. With it there is more or less associated lymphadenitis.

Mucous patches and skin lesions are the common manifestations of secondary syphilis. They present no distinctive pathological changes and cannot be recognized or differentiated by microscopical examination. The tertiary manifestations are mainly granulomata and the gumma is the type. Tumor masses are the result of round-celled infiltration, and contain many new-formed blood-vessels and a stroma of connective tissues. The lesions may persist as tumors of considerable size, but frequently degenerate and break down, thereby causing extensive destructive ulceration. Nearly every organ and tissue of the body may be affected.

SYMPTOMS.—There are three well-marked clinical stages in a typical case of syphilis: (1) the primary, marked by the appearance of the initial lesion, or chancre; (2) the secondary stage, or period of constitutional invasion; (3) the tertiary stage, during which gummata are formed and visceral affections are most prominent. These stages will be considered in detail.

1. *Primary Stage.—The Chancre.*—After a period of incubation averaging about three weeks (10 to 98 days—Sturgis and Cabot), a small papule makes its appearance at the site of infection. This is usually the glans penis or inner aspect of the prepuce in the male, or the inner surface of the labium in the female. The typical or Hunterian chancre has a peculiar hard or indurated feeling to the examining finger. Its surface finally becomes eroded or ulcerated, but it retains the same cartilaginous hardness. In "parchment" chancre the induration is slight and in some localities (as the vagina) it may be absent. The chancre is single, rounded, smooth, with clear-cut

edges, glazed over with a scanty grayish-white secretion, painless and is not very sensitive to the touch. It varies greatly in size. If *phagedenic* there is extensive and rapid destruction of tissue. Sometimes there is "mixed" infection with chancroidal virus; in these cases the inflammatory reaction is more

FIG. 10. A CHANCRE.

marked and the lesion is more destructive. The induration is later in appearance and the diagnosis is rendered more difficult. The dry papule occurs on the surface of the body and is rather rare. It makes a scaly, reddish nodule, but may become infected with pus microbes, thereby forming a pustule. When the initial lesion occurs in localities containing much loose areolar connective tissue, as the scrotum or labia, there may be an extensive edema of an indurative character.

The *bubo* of the primary stage consists of enlargement of the lymphatic glands nearest to the chancre, usually those of the groin. These are painless, hard, easily movable and show no tendency to suppurate. Both sides are affected.

2. *Secondary Stage.*—Usually within six or seven weeks after the appearance of the chancre this lesion is healed, or practically healed. The symptoms of the secondary stage now make their appearance. The patient complains of a feeling of lassitude and weakness, his sleep is disturbed, he is troubled with indigestion, his bowels are constipated and he becomes thin and anemic. There is slight fever (100° to 102° F.) and

headache and pains in the bones and joints; this pain is worst at night. There is also likely to be sore throat—a pharyngitis or tonsillitis; small ulcers may sometimes be found on the tonsils.

An eruption now makes its appearance upon the skin. The lesions assume a variety of types. They may be macular, papular, pustular, squamous or tubercular. Frequently they are

FIG. 11. PAPULAR SYPHILODERM.

mixed or more than one variety may be found at the same time. At the beginning of the secondary stage the macular eruption or roseola is most frequently found. Next in order of occurrence is the papular. The trunk is usually attacked first, especially on the chest, then the extremities and the face. In the last mentioned locality the eruption is most apparent upon

the forehead. Whatever form the eruption takes it is circular in its outline and the groups tend to assume a circinate arrangement. In color the lesions are usually of a dark coppery-red. There is no pain or itching.

Condylomata or syphilitic warts are common during the secondary stage. They appear most frequently upon portions of the body macerated by moist discharges, as the genitals, the anal margin, etc. They secrete a viscid semi-fluid substance and have a disgusting odor.

The eruption also appears upon the mucous surfaces, especially of the mouth and throat, and here also assume a number of types. It may be macular—distinct hyperemic patches, tending to erosion; more frequently it is papular, forming the so-called mucous patches—light-colored, elevated areas, which also frequently become eroded or ulcerated, when they are extremely sensitive and painful. Pustular eruptions make ulcerating sores or fissures upon mucous surfaces. The lips, cheeks, tongue, pharynx, larynx, etc., are frequently affected. These patches are extremely contagious and when upon the lips or tongue are not infrequently responsible for the transmission of the disease—as by a kiss. When the larynx is affected the voice is hoarse and muffled. Condylomata may also form in the mouth.

Falling of the hair is another symptom of the secondary stage of syphilis. There may be a uniform loss or it may come out in patches, giving the scalp a ragged appearance. Under proper treatment it is usually restored.

Affections of the eye, such as iritis, keratitis, choroiditis and sometimes retinitis may also occur during this stage.

3. *Tertiary Stage.*—After the disappearance of the secondary symptoms there is a period of latency, preceding the development of the tertiary stage. This seldom manifests itself before the second year and may be delayed for many years, the individual meanwhile enjoying good health. If properly treated, in the majority of cases, tertiary symptoms do not appear; Gottheil estimates that not more than one-tenth of those contracting syphilis develop tertiary symptoms. During this stage the disease is not infectious, nor is it transmitted to offspring.

The essential lesions of the third stage of syphilis are the gummata, infiltrated tumor-like masses of varying size which

show a marked tendency to break down. They are found in all portions of the body, the viscera and internal structures being very susceptible to attack. Tertiary syphilis of the skin assumes a number of forms. In *rupia syphilitica* the lesion is pustular in type, the scabs drying down so as to form a rough, laminated surface like an oyster-shell. At other times the eruption is tubercular, tending to ulcerate and spread at the periphery, forming the circinate and serpiginous tertiary syphilodermata. Gummata beneath the skin may break through with the formation of extensive ulcerating sores. The mucous membranes may also be the seat of syphilitic eruptions, erosions or fissures during this stage.

A peculiar deformity of tertiary syphilis is due to destruction of the cartilage and bones of the nose, causing sinking in of the bridge, or "saddle-nose." Periostitis and osteitis frequently occur; in the former case nodular tumors may be detected upon the bones of the skull and the long bones. Gummata may also form in the muscles, the myocardium or endocardium, arteries, the kidney, liver, spleen, mouth, pharynx, larynx, bronchi, lung, pleura, esophagus, gastric-mucosa, intestine, rectum, testicle, peripheral nerves, spinal cord, meninges, brain—in fact, in any locality. The character of the symptoms depends upon the locality and the structure and function of the organ or tissues affected.

Malignant syphilis is a form of the disease in which its evolution is very rapid and its symptoms very severe. It resists the usual methods of treatment and may terminate fatally.

Hereditary syphilis is transmitted only when one or both of the parents is suffering from secondary syphilis. Inherited syphilis is not transmitted to another generation, though the children of congenital syphilitics are often strumous or poorly nourished. Before the birth of a living child the mother is likely to have several abortions. The infant is not well developed; it is pale and thin; the skin is wrinkled and the face is drawn and pinched, giving the baby a prematurely old, weazened appearance; its cry is feeble and querulous; there is often a thin nasal discharge and obstructed breathing—the child has the "snuffles"; there may be a roseolar or papular eruption—often there are fissures about the angles of the mouth and the

anus. The liver and spleen are enlarged; sometimes there is jaundice or ascites.

In other cases the child seems strong and well at the time of birth and the symptoms of syphilis make their appearance some weeks later. These include ozena or nasal catarrh, sometimes associated with necrosis of the bones and cartilage, causing deformity of the nose, erythematous, papular or pemphigoid eruptions of the skin, fissures and condylomata of the angles of the mouth, the anus and the genital organs, mucous patches, falling of the hair, onychia and enlargement of the liver and spleen. There will also frequently be syphilitic disease of the bones, perhaps detachment of the epiphyses, causing a pseudo-paralysis. An important symptom of hereditary syphilis is the deformity of the permanent central incisors, known as Hutchinson's teeth. These are notched, eroded upon their chewing surfaces and narrow; they decay early. Children suffering from hereditary syphilis develop slowly, both physically and mentally.

DIAGNOSIS.—As distinguished from the chancroid the syphilitic or hard chancre is usually indurated and situated upon a non-inflamed base; its secretion is scanty; it is not painful on pressure; it is usually single and is not auto-inoculable; and there is an associated enlargement of the lymphatic glands (bubo), these showing no tendency toward suppuration. The chancre is not, however, always typical. In some localities, as the vagina, the induration may be entirely wanting; at times it may be only an erosion, so slight as to escape recognition. (See Chancroid.)

The syphilodermata exhibit so many forms and often show such a resemblance to other skin eruptions that the diagnosis may at times be very difficult. A coppery-red color, absence of subjective symptoms, a tendency to crescentic arrangement, a predilection for the trunk, the edges of the hair and the palms of the hand and soles of the feet, point toward syphilis.

Other characteristic symptoms of secondary syphilis are falling of the hair, pains in the bones worst at night, sore throat and mucous patches.

To establish the diagnosis of tertiary syphilis search should be made for scars left by primary and secondary sores, pigmentation of the skin remaining after the subsidence of the eruption

quired; if there is anemia, give iron; debility will be lessened by strychnin, arsenic, cod-liver oil and the hypophosphites; in rheumatism and gout the patient should receive the indicated remedies. Alcoholic drinks are not to be used unless the patient is long habituated to their use. Since the prolonged administration of mercury is likely to produce stomatitis the buccal cavity should receive careful attention. The teeth should be thoroughly brushed daily with a good tooth powder and the mouth washed with a chlorate of potash solution (5 to 10 grains to the ounce). Smoking tends to produce stomatitis and should be given up or reduced to a minimum.

The sheet anchor of treatment in secondary syphilis is *mercury*. This is administered in many forms and a variety of ways. The drugs usually taken internally, and their initial doses, are as follows: Protiodid of mercury ($^1/_5$ grain); the biniodid and corrosive sublimate ($^1/_{50}$ to $^1/_{20}$ grain); mercury with chalk ($\frac{1}{2}$ to 2 grain); calomel ($^1/_{10}$ to $\frac{1}{4}$ grain). Mercury is also used by inunction, by subcutaneous injection, by intramuscular injection and by fumigation. Each of these methods has its advocates.

The drug may also be used (1) continuously, (2) symptomatically and (3) intermittently. In the continuous method the patient is given at first small doses of the drug, the favorite form being the protiodid in $^1/_5$ grain pills; one of these is given three times a day and the dose increased by one pill a day until the point of tolerance is reached, as shown by slight tenderness of the gums, or diarrhea. The dose is now reduced by half and the drug continued for a year or more, as necessary. This is the so-called "tonic" method of Keyes. The only objection to it is that the patient may acquire a tolerance for the drug so that its effect will be lost in the face of special emergencies.

The symptomatic method which consists of the administration of mercury only when there are active symptoms is no longer much used. The intermittent treatment is most in favor. It consists of the use of the selected remedy for two or three months or so long as seems to be needed, followed by a period of remission of some weeks or months, after which its use is resumed. In this way several courses of mercurial treatment are given. In the intervals proper hygienic and tonic measures are

used. Of the preparations in use the protiodid is undoubtedly the favorite, although the biniodid, the bichlorid, gray powder, calomel or blue mass may be given in the doses indicated. The drug is pushed according to the necessities of the case and the dose may be increased or decreased according to the appearance of mercurialism. Stomatitis, fetor of the breath, and diarrhea are indications that the use of the drug should be temporarily intermitted, but if proper care is taken of the mouth and teeth it may often be given in large quantity over a considerable period. In England mercury with chalk, as recommended by Hutchinson, is a favorite remedy; it is not as likely to produce gastric or intestinal irritation as the bichlorid or biniodid. If one form of mercury fails to do good, another may be tried.

The mercury may be combined with iron; this combination is especially valuable if there is anemia, and iron being slightly astringent it reduces the probability of diarrhea. This pill is strongly recommended:

Mass mercury .....gr. 2
Iron sulphate, dried.....gr. 1

Three to six of these pills to be taken daily.

Hyde uses:

Mercury protiodid .....gr. 12
Mass iron carbonate.....dr. 1

Make 60 pills. One or two after each meal.

To hold any diarrhea in check combinations of opium with mercury are sometimes advised but this drug not only increases the probability of derangement of the stomach but its prolonged use may end in the formation of the opium habit.

Inunctions of mercury are in favor in Germany. A dram of mercurial ointment is rubbed into the skin once a day, after a hot bath, about fifteen minutes being consumed in the operation; the skin should be rubbed until it is dry. This is repeated once a day as long as necessary, with occasional remissions. A different area of skin (usually the axilla and groins in turn) is taken each day and hairy localities are avoided on account of the danger of producing eczema. The greatest objection to this method is its uncleanliness. As a substitute the oleoate of mercury (10 or 20 per cent) is used, ½ dram being rubbed alternately into the soles of the feet. This is continued for a week and after a few days' intermission is repeated.

Injections are usually made deep into the muscles. This method has been largely used in the British army with the best of results. Calomel and bichlorid of mercury are most used in this way, though metallic mercury rubbed up with oil has been employed. The greatest objection to this method of treatment is the pain and the occasional formation of an abscess. These disadvantages may be more than offset by the certainty that the patient gets full dosage of the drug and the fact that he is constantly under the physician's observation. The usual site for the injections is the insensitive fleshy part of the buttocks. A long hyperdermic needle is inserted full length, and the mixture deposited in the muscles. Bichlorid solution, if used, must be injected daily or every other day. The following solution is used:

Mercury bichlorid .....gr. 1
Glycerin .....dr. 2
Distilled water .....dr. 2

The dose is 10 minims, which may be increased or diminished.

The advantage of calomel is that it is absorbed slowly. It is usually suspended in oil but Gottheil prefers the following:

Calomel .....gr. 24
Glycerin .....dr. 2
Distilled water .....dr. 2

Five to fifteen minims are injected at intervals of five to fifteen days.

From ten to fifteen injections constitute the course and these courses are repeated from time to time according to the intermittent method.

Fumigation with vaporized calomel is now little used. The patient is placed in a hot enclosed vapor bath and calomel is vaporized under him so as to settle upon the skin. He is then put to bed wrapped in blankets. This is repeated several times.

Next to mercury in importance in the treatment of syphilis is iodin. The iodids are of little or no value in the early part of the secondary stage, but later, after a few months of mercurial treatment, the patient may be benefited by a course of "mixed" treatment. Perhaps the best way is to administer the drugs separately, giving mercury once a day and the iodid twice, or vice versa, or by giving the mercury an hour before meals and

the iodid after them as recommended by Gottheil. In other cases, as good results will be obtained by a combination like the following:

Mercury biniodid .....gr. 1
Potassium iodid .....oz. 1
Syrup sarsaparilla, comp.....oz. 2
Distilled water .....oz. 2
Teaspoonful in water three times a day.

Treatment of the Tertiary Stage.—Iodids are as specific for tertiary syphilis as mercury for the secondary stage. The potassium salt is usually preferred; it may be commenced in moderate doses (10 to 20 grains), but this should be rapidly increased in all serious cases. In tertiary syphilis there is a great tolerance for this drug and enormous quantities may be necessary to secure the desired results; 40 to 60 grains three times a day is usually indicated and twice this quantity may not be excessive. The most convenient method of administration is in saturated solution with distilled water, or:

Potassium iodid .....oz. 1
Distilled water .....oz. 1

This is best taken in milk or water, well diluted; the dose can then be easily modified according to the demands of the case.

The symptoms of iodism are malaise, disturbance of digestion, coryza, and an acne-like eruption. It is not always necessary to stop the administration of the drug when these appear; but some individuals are very susceptible to it. Eichhorst thinks that potassium iodid is better borne if sodium bromid is given with it. Compound syrup of sarsaparilla covers the taste of potassium iodid and has some reputation as a vegetable alterative. It may be given in some such combination as the following:

Potassium iodid .....dr. 5
Tinct. cimicifuga .....dr. 2
Syr. sarsaparilla comp.....oz. 5
Two teaspoonfuls in water three or four times a day.

Mercury may also be used with much benefit in tertiary syphilis. It is used in much the same manner as in the later part of the secondary stage. Shoemaker recommends:

Mercury biniodid .....gr. 3
Potassium iodid .....oz. 1
Tinct. iodin .....dr. 1
Syrup iron iodid.....oz. 1
Water .....oz. 3

A teaspoonful in water after each meal.

Hereditary Syphilis.—Mercury is the most useful drug. It may be given in the form of gray powder (grain $^1/_{10}$ to $\frac{1}{2}$), or calomel (grain $^1/_{20}$ to $\frac{1}{4}$) three times a day, or by inunction. In the latter case the mercurial ointment should be spread upon a flannel bandage which should be worn constantly over the abdomen.

Every attention should be given the child's general health. It should be well-fed and frequently bathed. Remember that it may communicate the disease and do not put it to the breast of an unaffected wet-nurse.

Tertiary syphilis may arise at puberty and should receive appropriate "mixed" or iodid treatment.

TABES DORSALIS—See Locomotor Ataxia.

TETANUS; LOCKJAW.

DEFINITION.—An acute infectious disease caused by a specific bacillus and characterized by convulsions and muscular rigidity.

ETIOLOGY.—Tetanus is invariably due to infection with the bacillus tetanus, discovered by Nicolaier in 1885. This is a short, club-shaped bacillus, multiplying by spores. It is anaërobic, that is, it does not grow in the presence of air. The spores are however destroyed with considerable difficulty. The germ is most abundant in manure, street dust and garden dirt, especially in damp and protected places where there is not free access of sunlight and air. Inoculation usually takes place through incised, punctured and lacerated wounds of the feet or hands. The reason that the rusty nail or the toy-pistol so frequently causes tetanus is because the street dust on the nail or staining the hands is carried to the bottom of a sinus into which air does not readily reach and where the germs may multiply in the wound secretion undisturbed.

PATHOLOGY.—The pathological changes are not marked. The wound which is the site of infection may be a small one and

perhaps will be entirely healed when the first symptoms of the disease appear. The toxins of the disease evidently attack the nerves and nervous centers. These sometimes show morbid changes.

SYMPTOMS.—After a period of incubation averaging one to two weeks the disease comes on slowly with increasing stiffness of the muscles of the lower jaw. These finally become rigid causing firm locking of the jaw (trismus), so that the mouth cannot be opened and mastication becomes impossible. This muscular spasm extends to the neck, causing retraction of the head, to the trunk which is curved backward upon the spine (opisthotonos) or laterally, and finally to the limbs which become rigid. The arms are least affected. Muscular rigidity is often excessive, permitting the support of the body between the feet and head. When the muscles of respiration are attacked there is serious interference with breathing. The abdomen is hard and board-like. The forehead is wrinkled and the corners of the mouth drawn up, causing a peculiar, ghastly, sardonic grin (risus sardonicus). A touch or a draft of air excites severe clonic convulsions causing great pain. The body is bathed in perspiration. At the beginning of the attack the temperature is normal or slightly elevated. Later in the disease it frequently becomes very high (105° to 110° F.). The mind usually remains unclouded throughout the course of the disease. The end may come in a few days or it may be delayed for several weeks.

DIAGNOSIS.—Tetanus is most likely to be confused with strychnin poisoning. The latter is rapid in its onset, lockjaw is absent or late in appearance, the extremities are all involved, there are intervals of relaxation, and death or recovery occurs very soon.

Hydrophobia gives the history of a bite by an animal, lockjaw is absent, there is no opisthotonos, the reflex nature of the seizures is apparent and the respiratory spasm is very marked.

PROGNOSIS.—Unfavorable. Eighty to ninety per cent of the patients die.

TREATMENT.—*Prophylaxis.*—By adherence to the rules of modern aseptic surgery most cases may be prevented. Free drainage, free access of air and perfect cleanliness are essential.

Every punctured or lacerated wound, especially of the foot or hand, should be enlarged so that free access may be obtained to every portion of it. It is then to be dressed antiseptically and allowed to heal from the bottom.

Attack.—The patient should be placed in a quiet room where he will be free from noises and excitement of any kind. His strength should be husbanded by an abundance of nutritious liquid food. After the jaw is locked this must be administered by way of the rectum, or by the stomach tube, which may be inserted through the nostril. Strychnin, digitalis, whiskey and other heart stimulants should be administered as necessary. Chloroform may be inhaled during the convulsions, or potassium bromid and chloral given in large doses by the rectum. Morphin, hypodermically, is usually required for the relief of pain.

As a curative measure the tetanus antitoxin has been used quite extensively. Thus far the results from this remedy have not proved very satisfactory but it is probably the best in our possession. It is believed to be of greatest value when used as a prophylactic. The dose of Behring's serum is 20 to 30 Cc. repeated every five or six hours.

Baccelli has reported good results from the hypodermic administration of carbolic acid in tetanus. During this disease there is a remarkable tolerance for this drug. Baccelli used a 2 per cent solution, giving at first 3 grains in twenty-four hours and rapidly increasing the quantity. Others have used much larger quantities of the acid. In a case reported by Nietert and Amyx (St. Louis Med. Review) 99 grains were given in the first twenty-four hours and 267 grains were injected during the course of the disease. This patient recovered.

TINEA TRICHOPHYTINA; RINGWORM

DEFINITION.—A contagious disease of the skin caused by a vegetable parasite, the trichophyton.

VARIETIES.—The common varieties are (1) tinea circinata, ringworm of the body; (2) tinea tonsurans, ringworm of the scalp; and (3) tinea sycosis, or "barber's itch."

ETIOLOGY AND PATHOLOGY.—Ringworm is caused by a vegetable parasite. As a matter of fact more than one kind of

parasite is concerned in the causation of the disease. The two principal ones are the small-spored (microsporon Audouini), and the large-spored (trichophyton megalosporon). The spores of the former have a mosaic-like arrangement; those of the latter are bead-like. There are also sub-varieties. The clinical types produced by the two main varieties are somewhat different. Tinea is contagious and may be transmitted directly or indirectly from one individual to another. Tinea sycosis (barber's itch) is usually spread in the barber shop by infection of towels, brushes, combs, razors, etc. The other forms of ringworm usually occur in children; this is particularly true of tinea tonsurans which is essentially a disease of childhood, yet an adult may contract tinea circinata from ringworm of the scalp occurring in a child; or the reverse may be the case.

The parasite consists of mycelium and spores and is found in the horny layers of the epidermis, hair follicles and the hair itself. The spores predominate in hairy regions and the fungus is most abundant upon or within the hairs. The small-spored variety covers the hair like a sheath; the large-spored one also invades the interior of the hair-cylinder. The secondary results are inflammation, cellular infiltration and suppuration. To examine the hairs under the microscope they should first be moistened with liquor potassæ.

Symptoms.—*Tinea circinata.*—The disease appears as one or more circular, reddened spots or patches, increasing rapidly in size, spreading at the periphery while healing in the center. The peripheral lesions are somewhat elevated, hyperemic, slightly scaly, and often consist of papules or vesicles. There is some itching but this is seldom severe. There may be a number of these rings, several may coalesce, or a large area may be attacked. Tinea cruris, which occurs upon the groin and thighs, is likely to involve a large area and manifest inflammatory symptoms of an erythematous or eczematous type. Ringworm of the nails is rare, these tissues becoming thickened, yellowish and soft or brittle.

Tinea tonsurans occurs principally in children. It is usually first seen as a circumscribed, circular patch, partially denuded of hair. The hairs are short, stubby, twisted in various directions, dull and lusterless, though often darker than normal.

The inflammatory symptoms are most marked near the circumference, where the hairs are shortest. The color of the patch is grayish; it is somewhat elevated and covered with scales. In some cases the hairs are broken off near the surface and the patch is completely bald, but with a black "stippled" appearance due to the emergence of the hairs from the follicles. In a rare form of the disease the process is widely disseminated throughout the scalp. Tinea kerion is an inflammatory type in which there is a honeycomb-like, edematous tumor which discharges a purulent secretion from its dilated follicles. Itching and burning is more severe than in the ordinary types, in which it is usually slight.

Tinea sycosis (barber's itch) is similar in its essential characteristics to the other forms. The lesions are reddened and shiny, have at first a circular arrangement, assume a nodular or lumpy appearance, are tender and painful and may cause considerable itching. They often break down and form crusts upon the surface. The hairs break off and come out but in a less degree than on the scalp.

DIAGNOSIS.—The circular outline, healing center, and the slight scaliness are characteristic of the body form. The broken and twisted hairs, the partial baldness and the scaling, elevated or nodular lesions are pathognomonic in hairy regions. Eczema, seborrhea, psoriasis and sycosis can hardly be mistaken for ringworm if their symptoms are understood. In doubtful cases a microscopical examination will settle the question. It should be remembered that eczema is not an infrequent complication.

PROGNOSIS.—All forms of ringworm are curable, though in the hairy regions it may resist treatment for some time.

TREATMENT.—The treatment consists mainly in the application of parasiticides, but the difficulty of bringing these into contact with the fungus often makes its destruction difficult. The efficacy of the remedy is often due more to the effect of the inflammatory reaction which it excites than to the direct action of the drug.

Tinea circinata is more amenable to treatment because of the superficial location of the parasite. Among the remedies recommended are painting with tincture of iodin or formaldehyde (40 per cent), lotions of mercuric chlorid, sodium hyposulphite,

sulphurous acid, carbolic acid and caustic potash, and ointments of ammoniated mercury, sulphur, tar, chrysarobin (see Psoriasis for method of application), pyrogallic acid, etc. Below are good formulas:

Ammoniated mercury	gr.	20—30
Lanolin	oz.	½
Vaselin	oz.	½

Rub in two or three times daily.

Or—

Iodin	dr.	1
Potassium iodid	gr.	30
Alcohol	dr.	3
Water, enough to make	oz.	1

Use locally two or three times a day.

Or—

Creosote	m.	20
Oil cade	dr.	3
Sulphur	dr.	3
Potass. bicarb	dr.	1
Lard	oz.	1

Use locally.—Van Harlingen.

Tinea tonsurans is often eradicated with considerable difficulty since the fungus attacks the roots of the hair and their sheaths, extending to the bottom of the follicles. It is therefore not reached by superficial applications. The hair should be cut short and the scalp thoroughly shampooed with tincture of green soap or some other good antiseptic soap. This washing should be frequently repeated. The parasiticide is now applied usually in the form of an ointment, the same remedies being used as in ringworm of the body. In order that the remedy may penetrate the follicles it is essential that it should be thoroughly and persistently rubbed in for several minutes at a time. Removal of the diseased hairs (epilation) hastens the cure but this is often difficult on account of their brittleness. It may be wise to extract sound hairs at the periphery into which the fungus is beginning to spread.

Below are some good formulas for use in ringworm of the scalp:

Precipitated sulphur	dr.	½
Ammoniated mercury	dr.	½
Salicylic acid	gr.	20
Lanolin	oz.	½
Vaselin	oz.	½

Or—

Ammoniated mercury	gr.	30
Ichthyol	dr.	1
Lanolin	oz.	½
Cerate	oz.	½

Or—

Carbolic acid	oz.	½
Mercury nitrate ointment	oz.	½
Sulphur ointment	oz.	½

Apply twice daily.—Van Harlingen.

Chrysarobin is a favorite application, as in ringworm of the body, but it must be applied with great care so that it shall not get into the face and eyes. Unna's compound ointment (see Psoriasis) or the following may be used:

Chrysarobin	dr.	1
Salicylic acid	gr.	24
Ichthyol	dr.	1
Petrolatum, enough to make	oz.	2½

Painting with formaldehyde (40 per cent solution), tincture iodin or pure carbolic acid may be tried. Here as elsewhere the induced inflammatory drug reaction often has a beneficial result. The patch may be blistered or a drop of croton oil spread on the surface and a poultice put over it so as not to slip and spread the oil. By the latter plan a pustule is formed (artificial kerion) which is usually curative. There is some danger of this destroying the hair.

Tinea sycosis.—This form is treated in the main as just directed for ringworm of the scalp, but epilation is much more easily performed and is to be recommended, the hairs over the diseased nodular areas being removed every other day after one day's growth of beard. The face may be shaved on alternate days. The lotions and ointments (except those containing chrysarobin, croton oil and the vesicants) may be used. Walker prefers a 10 per cent oleate of copper ointment.

TINEA VERSICOLOR; PITYRIASIS VERSICOLOR.

DEFINITION.—A vegetable parasitic disease of the skin.

ETIOLOGY.—It is caused by the presence in the superficial layers of the skin of the microsporon furfur. It is mildly contagious.

SYMPTOMS.—The disease commences as a number of small, irregular or rounded macules. These increase in size and coalesce, thereby forming patches of variable dimensions and outlines, often covering large areas of skin. The lesions are yellowish to brown in color and when closely examined are found to be covered with fine, furry scales which are readily removed by the finger nail. The disease most frequently attacks the chest, then the back and other portions of the trunk, next the flexor surfaces of the arms and the legs. The face, feet and hands usually escape, the fungus having a predilection for portions of the body protected from the light. Profuse sweating favors the spread of the disease. Mild itching is the only subjective symptom.

DIAGNOSIS.—The parasite is very abundant in the skin and easily found with the microscope, so that in case of difficulty the diagnosis is easily made.

The macular syphiloderm is readily differentiated by the history, the less chronic course of the eruption and the usual associated symptoms; the eruption may also be seen on hands and face.

Chloasma presents no scaling and is likely to involve the face.

PROGNOSIS.—The disease is readily curable by proper treatment; without this it is very chronic. Relapses are common.

TREATMENT.—The superficial layers of the skin should be removed by bathing in hot water and scrubbing the body with tincture of green soap or any strong alkaline soap. Hyde recommends that this should be done for three successive nights. After bathing the skin is rinsed with clean hot water, moistened with vinegar or dilute acetic acid, then wet with an aqueous solution of sodium hyposulphite (dram to the ounce). Other drugs used in lotion or ointment are resorcin, carbolic acid, mercuric chlorid, white precipitate, sulphur, ichthyol, formaldehyde, iodin, etc. Any parasiticide will do.

TONSILLITIS, ACUTE; AMYGDALITIS; QUINSY.

DEFINITION.—Acute inflammation of the tonsils.

VARIETIES.—The common varieties are: (1) Acute catarrhal or simple tonsillitis; (2) acute follicular, lacunar or cryptic tonsillitis; (3) acute parenchymatous tonsillitis, tonsillar or peritonsillar abscess or quinsy.

ETIOLOGY.—Tonsillitis occurs most frequently in children and young adults and the rheumatic, gouty and tubercular diatheses are predisposing factors in its production. Rheumatism, particularly, seems to have a close relationship to the disease; it is probable, in many instances at least, that the infecting rheumatic agent enters the system by way of the throat and excites a local inflammation.

Exposure to cold or sudden changes of temperature are common exciting causes. Suppurative tonsillitis (quinsy) is due to the presence of pus microbes,—staphylococci and streptococci. Tonsillar inflammation is frequently a symptom of other diseases, as diphtheria, scarlatina, erysipelas, etc. It may also be excited by contact with irritating liquors or gases, foreign bodies or local injuries.

PATHOLOGY.—In the catarrhal form the inflammation is a superficial one, the mucous membrane presenting the ordinary characteristics of an inflammation elsewhere.

In follicular tonsillitis the follicles or lacunae are filled with a cheesy mass consisting of broken-down epithelial debris containing microorganisms which act as irritants to the tissues and cause more or less inflammation and swelling of the gland, due to infiltration with serous exudate. The openings of the crypts are often capped with a fibrinous exudate simulating the false membrane of diphtheria. Severe cases may result in abscess.

In parenchymatous tonsillitis the whole gland substance is greatly infiltrated, swollen and inflamed. The process often starts from infection of the follicles with pus microbes. It rapidly invades the stroma of the gland, usually spreads to the peritonsillar connective tissues, and frequently eventuates in an abscess in the tonsils or the cellular tissue surrounding it. The lymphatics of the neck and under the tongue are enlarged.

A herpetic form of tonsillitis is also described, in which a vesicular eruption is found on the gland.

The so-called rheumatic form shows no structural differences from the varieties already described.

SYMPTOMS.—*Acute Catarrhal Tonsillitis.*—The attack is usually preceded by malaise, headache, muscular pains and a slight chill or chilliness, followed by mild fever. It commences as a rule quite abruptly. Upon examination the tonsil and the adjacent mucous membrane are found to be red and swollen and covered with sticky mucus, which in severe cases may simulate a false membrane. There is decided discomfort and some pain, which is often reflected to the ear and angle of the jaw and is increased by efforts at swallowing. The voice is altered in quality and pitch. There is a tendency for these attacks to recur and, in children, this may result in chronic enlargement of the tonsil.

The constitutional and subjective symptoms of *follicular tonsillitis* are practically identical with the preceding form, though often more severe. Examination of the throat shows the presence upon the surface of the tonsils, which are often greatly swollen, of a number of yellowish spots corresponding to the mouths of the follicles. These spots consist of cheesy plugs of degenerated gland secretion and epithelium, and can be pressed out with a suitable instrument. There is often considerable inflammatory exudate which forms upon the surface of the gland, simulating, in some cases, the false membrane of diphtheria. Follicular abscesses may be formed if the glands are infected with pus microbes.

In the *parenchymatous form* (quinsy) the symptoms are still more acute. The mouth is dry, the pain is severe and continuous and greatly increased by swallowing or motion, the voice is muffled and indistinct, the tongue is coated and the breath foul, the tonsils are swollen so as to nearly close the pharyngeal opening and thus interfere with respiration. There is enlargement of the submaxillary glands. The mouth can hardly be opened on account of the swelling and pain. There are chills and fever (103° to 105° F.). In the majority of cases an abscess forms in one tonsil which usually ruptures sponta-

neously within a few days. This gives immediate relief. Rarely suppuration occurs in both tonsils.

DIAGNOSIS.—The only disease with which tonsillitis is likely to be confused is diphtheria. If there is considerable inflammatory exudate this may simulate a false membrane. This is particularly true of follicular tonsillitis. A bacteriologic examination of the secretion is sometimes necessary to positively decide the question.

The diphtheritic membrane is removed with difficulty, leaving a bleeding surface, the membrane rapidly re-forms, it extends beyond the tonsil to the fauces, uvula and sometimes the nares. The constitutional symptoms are more severe, the cervical glands are enlarged and the Klebs-Loeffler bacillus may be found. (See Diphtheria for further discussion.)

The premonitory sore-throat of scarlatina is soon followed by the characteristic eruption.

PROGNOSIS.—Favorable. Death has resulted in cases of quinsy from suffocation by emptying of the abscess during sleep and by ulceration of the carotid artery, but such cases are very rare. Middle-ear inflammation is an occasional complication.

TREATMENT.—During an attack of tonsillitis the patient should be kept quiet—in bed if the case is severe—and unnecessary talking and swallowing forbidden. A nutritious liquid diet is the best. Treatment should be commenced with calomel in small, repeated doses ($\frac{1}{8}$ to $\frac{1}{4}$ grain, with sodium bicarbonate, 1 grain) every half hour until one or two grains of the calomel have been taken, followed by a saline, as Epsom or Rochelle salts, citrate of magnesia, or Hunyadi or Apenta water.

If the case is treated energetically at the beginning of the attack it may often be aborted or its course shortened. If rheumatic in its origin, the salicylates are indicated. Sodium salicylate is given in 20 grain doses three or four times daily. Other salicylates, salol and salicin are preferred by some clinicians. They may be used alone or in combination with other drugs. A favorite remedy in the treatment of tonsillitis is guaiac. The ammoniated tincture is taken in milk or wine in 15 to 60 minim doses every two to four hours. Quinin is recommended by many authors. Kyle prefers the bromid which

he uses in all forms of the disease. In the catarrhal form he recommends the following capsule:

Quinin bromid .....gr. 2
Ext. belladonna .....gr. ⅛
Salol .....gr. 3

A tablet like this to be taken every three hours.

When there is associated fever and headache relief may be obtained by the following:

Quinin bromid .....gr. 3
Phenacetin .....gr. 3
Salol .....gr. 2½

One every three hours.

A tablet which is said to be very useful in these cases contains:

Ammonium salicylate .....gr. 3
Phenacetin .....gr. 1
Caffein .....gr. ½
Salicin .....gr. 1½

Sodium benzoate is another highly esteemed remedy. Stevens gives this formula:

Sodium benzoate .....dr. 1—4
Glycerin .....oz. 1
Elix. calisaya .....oz. 1

A teaspoonful every hour or two.

Abraham (Jour. Am. Med. Ass.) combines this drug with quinin and salol in the catarrhal form of tonsillitis, as follows:

Quinin hydrobromate .....gr. 1
Sodium benzoate .....gr. 2
Salol .....gr. 5

One every three hours.

In the more severe forms he gives guaiacol carbonate with it:

Guaiacol carbonate .....gr. 1
Sodium benzoate .....gr. 2
Sodium salicylate .....gr. 5

To make one powder. Take in milk or water every two hours.

In case the pain interferes with sleep an opiate may be necessary. Dover's powder may be taken at bedtime. Given early it helps to limit the inflammation.

The arterial sedatives, aconite and veratrum viride, are decidedly useful if the febrile symptoms are marked and in some

cases it is believed their early use will cut short an attack. The following well-known "tonsillitis" tablet is a useful combination:

Tinct. aconite .....gtt. $^1/_5$
Tinct. belladonna .....gtt. $^1/_{10}$
Tinct. bryonia .....gtt. $^1/_{10}$
Red iodid mercury.....gr. $^1/_{100}$

A tablet may be taken every hour until physiological effects are produced, then at longer intervals.

Emil Mayer of New York believes that it is possible to abort these cases, especially of peritonsillar abscess, by the use of the following combination:

Morphin sulphate .....gr. 1
Tinct. veratrum viride.....dr. 1
Water .....oz. 4

Teaspoonful every hour for three hours, then once in three hours.

This, he states, will cause disappearance of all the symptoms within twenty-four hours if given sufficiently early.

A good sweat, induced by pilocarpin hydrochlorid ($^1/_{12}$ to $\frac{1}{8}$ grain) also helps to break up an attack.

Local treatment is of great importance. At the beginning of the attack cold is indicated. Cold compresses may be applied externally and pieces of ice held in the mouth or the throat gargled with ice water. After the disease is thoroughly established this is no longer to be used. Heat externally (hot-water bag or hot compresses) and hot gargles now give the most relief and hasten resolution. If there is marked parenchymatous inflammation, scarification or multiple puncture of the gland followed by hot applications is useful in hastening resolution.

Kyle recommends that the gland be touched with pure guaiacol. This is applied with a probe wrapped with cotton. In the follicular form the crypts should first be carefully emptied with a small curette or scoop and the guaiacol applied carefully to these little cavities on a cotton-covered probe. Goldstein advises that these applications be made at intervals of eight hours and thinks that two or, at most, three applications will effect a cure in follicular cases.

Tincture of chlorid of iron is a remedy of established reputation for local application in tonsillitis. A mixture with equal quantities of glycerin may be swabbed over the tonsil, or, in

severe cases, the iron may be taken internally in 12 to 20 drop doses. Potassium chlorate may be added, as in:

Potassium chlorate	gr. 30
Tinct. iron chlorid	dr. 2½
Glycerin	dr. 2½
Water, enough to make	oz. 1

The Medical Council recommends that the throat be scrubbed on alternate hours with this and hydrogen peroxid. Astringent sprays of Dobell's or Seiler's solution, listerine, borolyptol, etc., are also useful. After all nothing is better than a gargle of ammoniated tincture of guaiac, a teaspoonful in water or milk. Or the 2 grain guaiac lozenges may be allowed to dissolve in the mouth. A hot, mildly alkaline solution, as of sodium bicarbonate or glyco-thymoline is also useful as a gargle.

Since the introduction of suprarenal gland its solution (5 to 10 per cent) has been applied locally in cases of tonsillitis with surprisingly good results. It reduces the swelling, thereby relieving pain and permitting of greater ease of swallowing and breathing. It has also been shown to facilitate the evacuation of pus in both tonsillar and peritonsillar abscess unless it is deeply situated. Swabbing with this solution (or one of the new salt, adrenalin hydrochlorid—1 to 5000) should be tried in severe cases. It might advantageously be combined in some cases with cocain or chloretone.

H. J. Lipes (N. Y. Med. Jour.) has tried parenchymatous injections of carbolic acid in 1 to 4 per cent solution to abort cases of follicular and suppurative tonsillitis, with good results. The injections were made with an extra long hypodermic needle, bent near the end at an angle of 45 degrees to prevent introducing it too deeply. No bad results were produced and the results were satisfactory in the cases treated.

If in spite of treatment the case proceeds to suppuration (quinsy), as soon as pus has formed the abscess should be opened. A 4 per cent solution of cocain should be applied and the opening made with a sharp, pointed bistoury. About one-half inch of the knife should be left uncovered, adhesive plaster or cotton being wrapped around the blade to prevent its entering too far. The incision should be directed downward and inward, so as to avoid the possibility of wounding the great vessels of the neck which pass near the gland externally.

TUBERCULOSIS.

DEFINITION.—An infectious disease caused by a specific germ and characterized by the formation of tubercles.

ETIOLOGY.—Tuberculosis occurs among all races, but the negro, the American Indian and the Irish are peculiarly susceptible. It also occurs in all climates but is most frequent in the temperate zone where the changes of temperature are most abrupt. Humidity seems to favor its occurrence. Residence in damp, exposed localities or in houses that are damp, improperly ventilated or overcrowded, predisposes to the contraction of the disease. Certain sedentary occupations, such as tailoring or shoemaking, also favor its development, both on account of the cramped position which they require and the poorly ventilated, overheated and unhygienic apartments in which these individuals live and work. Tuberculosis is not directly transmitted from parent to child but there is in the majority of cases an inherited predisposition. The form of the chest seems to have some influence upon the causation of pulmonary consumption. Most cases occur in persons with the flat or the long, narrow chest. An attack of bronchial catarrh very often precedes the inception of the disease. Any debilitating condition may be sufficient to permit of its implantation. Many cases of tuberculosis, especially of the bones and joints, date from some injury.

The exciting cause is always the bacillus tuberculosis, discovered by Koch in 1882. This is a small organism 2 to 6 microns in length, its diameter being one-fifth to one-sixth its length. It is often slightly curved and under a high power has a beaded appearance. Tubercle bacilli retain their virulence outside of the body for weeks but are readily destroyed by sunlight. They usually enter the body through the respiratory tract by the inhalation of sputum, either directly from a patient having tuberculosis or carried in the dust of railroad or street cars, shops, bedding and furniture, or even in street dust. They may also be taken into the stomach with infected meat or milk or by putting infected objects into the mouth. The milk from tuberculous cows is believed to be a frequent source of the disease, especially in young children. Rarely the bacilli enter

the body through wounds or abrasions of the skin. This is the cause of lupus.

PATHOLOGY.—The histological structure most characteristic of tuberculosis is the tubercle. This is a small, grayish, rounded body varying in size from that of millet (hence called miliary tubercle) to mustard seed. Each tubercle comprises three or four smaller or submiliary tubercles. These are formed in the following manner: The tubercle bacilli produce irritation at certain foci, resulting in the proliferation of connective tissue cells which cluster around the point of irritation. These newly formed or epithelial cells are larger than the cells from which they are derived. In the midst of these there are formed one or more giant cells, each having four to twenty nuclei clustered at its periphery, and containing bacilli. Outside the epithelial cells there is a zone of leukocytes or lymphoid cells. The nutritive blood supply is poor, so that ultimately the central portion of the tubercle undergoes fatty degeneration or caseation, the color of the tubercle at the same time becoming yellow. In localities where the tubercles are closely clustered together a number of them become united into a tubercular mass, and their degenerated centers form a focus of caseated material of increasing size; this finally softens in most cases and may, as in the lung, break down and form an abscess or fistula connected with an ulcerating cavity. In more favorable cases the process is checked by the formation of a wall of fibrous connective tissue at the periphery of the tubercle which encapsulates the caseous mass. This mass may finally be absorbed or undergo calcification.

The tubercular process varies according to the anatomical structure of the affected tissue. In some localities the tendency is to the formation of clusters and consequent extensive tissue destruction; in other localities the tubercles remain discrete with no very marked tendency to degeneration. Nor is the histological structure always as described. The giant-cells and even the epithelial cells may be wanting. There is not a structure in the body which is immune to tubercular infection. The most common localities are the lungs, lymphatic glands, brain, joints, bones and the genito-urinary system. We may also have a generalized tuberculosis. This is caused by breaking of a

tubercle into a blood vessel by which means the bacilli are disseminated throughout the body.

In this article we shall consider only the forms of tuberculosis amenable to medical treatment. Many forms are peculiarly surgical.

ACUTE MILIARY TUBERCULOSIS; ACUTE GENERAL TUBERCULOSIS.

DEFINITION.—A form of tuberculosis in which there is widespread dissemination of the disease throughout the body.

ETIOLOGY.—General tuberculosis is always secondary to a local process. The spread of the disease is due to breaking down of tubercle and the entrance of the bacilli into a blood vessel by which means they are disseminated. According to Carnot the vessels which are most prone to bacillary attack and penetration comprise in order of frequency the pulmonary veins, thoracic duct, vena azygos (infected from retroperitoneal glands), external jugular vein, cervical glands, etc., and small arteries and veins, those which traverse the bronchial glands. It usually occurs in early life and may follow an attack of measles, whooping cough or typhoid fever.

PATHOLOGY.—The appearance, structure and pathogenesis of the tubercle has already been described. In general tuberculosis the tubercles are very numerous and generally discrete. They are found in all parts of the body, including the lungs, bronchi, pleura, endocardium, peritoneum, kidney, liver, spleen, brain, meninges, choroid and marrow of the bones. The lungs, pleura and meninges are most often affected.

SYMPTOMS.—1. *Typhoid Form.*—The onset of the disease is usually gradual, the patient complaining of malaise, loss of appetite, headache and slight feverishness. In some cases there may be nose bleed. The resemblance to typhoid fever is often marked. The temperature is moderately high (102° to 105° F.) but is irregular, does not present the step-ladder course of typhoid and the morning remissions are greater. Sometimes it is intermittent, reaching normal or below in the morning. Very rarely there is no fever. The pulse is rapid and weak, but never dicrotic, the respiratory rate is quickened, there is dyspnea and cyanosis. There is a slight cough and a small amount of

bronchial mucus is expectorated. As the disease progresses the typhoid symptoms become more marked. The tongue is dry, brown and fissured; there is increasing emaciation, pallor and loss of strength; often there is great perspiration; nervous irritability, delirium, subsultus tendinum and stupor rapidly ensue. There is cutaneous hyperesthesia and herpes labialis. Nausea, vomiting, diarrhea and abdominal distention are also observed. Ehrlich's diazo reaction may be found.

2. *Pulmonary Form.*—The fever, pulse rate and general symptoms resemble those of the preceding form. Dyspnea and cyanosis are more marked, the respiration more rapid, the cough more troublesome and expectoration more profuse and sometimes stained with blood.

The physical signs are those of bronchitis or bronchopneumonia.

3. *Meningeal Form (Tubercular Meningitis).*—This form usually occurs in children two to seven years of age. The pia mater at the base of the cerebrum is the membrane usually attacked. There is generally an inflammatory exudate which often finds its way into the Sylvian fissures.

During the prodromal period the child is fretful, complains of headache, pains in the limbs, and photophobia, the appetite is poor, the tongue coated, there are attacks of nausea and vomiting and constipation. Pallor and emaciation are noticeable.

Stage of Excitement.—This stage comes on gradually or may be ushered in by chills or convulsions. There is moderate fever (102° to 103° F.), with morning remissions. Headache now becomes intense and is increased by light or sound. The child has a characteristic cry, consisting of a succession of short, piercing screams (hydrocephalic cry); this may be continuous. The breath is foul, appetite is wanting and vomiting is frequent. There is obstinate constipation and the abdomen becomes distended and tympanitic. The skin is sensitive or painful to the touch, the pupils contracted and there is excessive irritability, muscular twitching, general or local convulsive seizures, sometimes opisthotonos and mental stupor and delirium. After a week or ten days there may be a temporary improvement in the symptoms.

Stage of Paralysis.—During this stage the temperature be-

comes high (105° to 110° F.), the pulse exceedingly rapid and feeble and the breathing irregular, often Cheyne-Stokes in type shortly before death. The pupils are widely dilated, the lids partially closed (ptosis); there is strabismus and optic neuritis. There are localized spasm and paralysis of various muscles; sometimes there is hemiplegia. The patient passes into a comatose condition and dies.

DIAGNOSIS.—Acute general tuberculosis of the typhoid type is often mistaken for typhoid fever. The following table will assist in the diagnosis:

ACUTE MILIARY TUBERCULOSIS.	TYPHOID FEVER.
Family history of tuberculosis.	Disease may occur during epidemic or traced to defective water supply.
Nosebleed a rare symptom.	Nosebleed a common early symptom.
Fever irregular; "step-ladder" course absent; remissions greater than in typhoid; often intermissions.	Fever curve characteristic; step-ladder course; no intermissions except in case of accidents.
Pulse very rapid and small; never dicrotic.	Pulse slow as compared with elevation of temperature; dicrotic.
Respiration rapid; dyspnea often marked.	Respiration not greatly accelerated; no dyspnea.
Spleen enlarged, but not greatly.	Spleen usually much enlarged.
Eruption usually absent.	Rose-colored spots appearing at end of first week.
Herpes labialis present.	No herpes.
Abdominal symptoms not marked.	Abdominal symptoms marked.
Constipation the rule.	Diarrhœa the rule.
Tubercle bacilli sometimes found in blood.	Typhoid bacilli found in stools, and sometimes in blood and urine.
Widal reaction absent.	Widal reaction present.
Choroid tubercles present.	Choroid tubercles absent.
Leukocytosis often present.	Leukocytosis absent.

PROGNOSIS.—The disease is practically always fatal. The typhoid form lasts from one to six weeks, the pulmonary form may be more prolonged, while the meningeal form averages

three or four weeks but may persist for several months before death brings relief.

TREATMENT.—The treatment is purely palliative. The diet should be liquid. High temperature is reduced by cold sponging, opium is administered for the relief of pain and cough and the bromids for excitability or delirium.

PULMONARY TUBERCULOSIS; PHTHISIS PULMONALIS; CONSUMPTION.

VARIETIES.—(1) Acute pneumonic phthisis; (2) chronic pulmonary tuberculosis; (3) fibroid phthisis.

ACUTE PNEUMONIC PHTHISIS; PHTHISIS FLORIDA; GALLOPING CONSUMPTION.

PATHOLOGY.—The general pathologic process does not differ from that elsewhere described, but the disease attacks large areas in the lungs and proceeds with unusual rapidity and virulence. Often both lungs are simultaneously affected. There are two types of the disease: (1) The pneumonic, and (2) the bronchopneumonic. The first usually commences in a single lobe and spreads rapidly to other portions of the lung and to the opposite lung. The second presents a number of affected areas. In both cases the lung tissue undergoes consolidation and soon breaks down with the formation of abscess cavities.

SYMPTOMS.—The *pneumonic type* often attacks debilitated individuals, especially those addicted to the use of alcohol; it is frequently seen in grippe epidemics. The early symptoms are those of an ordinary lobar pneumonia, but instead of terminating in crisis the fever continues, expectoration increases, becomes of a prune-juice color, and the physical signs of cavity formation (see Chronic Tuberculosis) may be made out. Occasionally there is bronchial hemorrhage, with considerable loss of blood. Rapid pulse, dyspnea, night sweats and emaciation are prominent symptoms.

In the *bronchopneumonic type* the disease is usually a sequel of measles, whooping-cough, diphtheria or debilitated states and occurs most frequently in strumous children. The symptoms are at first those of bronchopneumonia, viz., fever, a troublesome cough and dyspnea.

Upon *physical examination* areas of consolidation, bronchial breathing and mucous and submucous rales may be made out. The apices of the lungs are usually first involved. Hemoptysis, hectic fever, night sweats, increasing anemia and emaciation and loose, muco-purulent expectoration are prominent symptoms. In adults the disease commences more abruptly, often as an ordinary cold. A severe hemorrhage from the lungs may be the first suggestion of serious trouble.

DIAGNOSIS.—The differential diagnosis between acute phthisis and pneumonia, either lobar or lobular, is extremely difficult, even impossible in the early stage. If the disease shows a tendency to linger the sputum should be examined for tubercle bacilli. (See the article on Pneumonia.)

PROGNOSIS.—Almost inevitably fatal. Death usually occurs within three months, sometimes within as many weeks. In very exceptional cases the patient may recover or the disease become chronic.

TREATMENT.—The treatment is that of chronic pulmonary tuberculosis.

CHRONIC PULMONARY TUBERCULOSIS.

ETIOLOGY.—The causes have already been given under the general head.

PATHOLOGY.—Chronic pulmonary tuberculosis usually attacks one lung only, though the other is often involved when the disease is well advanced. The morbid process in most cases appears in the apex. There is some difference of opinion as to which side is most likely to be affected. Osler's investigations give a slight preponderance to the right. From this focus the disease spreads to the lower lobes of the same side and finally to the apex of the opposite side. The bacilli usually enter the lung through the air passages and finally, by aspiration, reach the smaller bronchial subdivisions or alveoli, where they produce irritation resulting in the proliferation of the fixed cells, finally resulting in the formation of tubercles, as already described (see general discussion of Etiology at the beginning of the article on Tuberculosis). These tubercles fill the lobules with characteristic masses, each presenting upon cross-section a bronchiole

plugged with exudate, a central caseous mass surrounded with epithelioid cells and a periphery infiltrated with leukocytes.

These tubercles spread along the bronchioles, to the smaller and then larger bronchi, causing a peribronchial inflammation. The bacilli also infiltrate the bronchial walls to the submucosa and produce weakening of these structures. By the coalescence of the tubercles at the primary seat of the disease a cheesy mass of varying size is formed which finally ruptures into the bronchi, through the weakened walls. The caseous matter softens, secondary infection with pus microbes ensues and a cavity is formed.

These cavities vary greatly in size; they may be very minute or as large as an orange. They are lined with a smooth, pus-secreting membrane and usually communicate with bronchi. Dilated blood-vessels often project into them or may even be carried through them upon trabeculae. When these rupture there is serious, often fatal, hemorrhage. In favorable cases these cavities may be encapsulated, as elsewhere described; sometimes the caseous matter becomes calcified.

Pleurisy is constantly present. This is usually due to extension of the tuberculous process, but it may be primary. The exudate may be fibrinous or serous and adhesions frequently form. Tuberculosis of the pericardium is a rare complication.

Symptoms.—The onset of the disease may be either gradual or abrupt; it may commence in a variety of ways. In many, probably most cases, the patient has at first the symptoms of an ordinary "cold," or bronchitis; the cough, however, persists, does not yield to treatment, and there is anorexia, loss of weight and strength and slight feverishness at night. In other cases he is susceptible to colds and the repeated attacks finally give place to the symptoms of tuberculosis. Less frequently the earliest symptoms are gastro-intestinal, with indigestion, progressive loss of flesh and anemia. Sometimes laryngeal symptoms are the earliest manifestations; these are hoarseness, aphonia and cough.

Pulmonary tuberculosis may develop gradually from a cervical adenitis or commence as an attack of pleurisy, influenza or pneumonia. The first symptom to attract attention may be hemorrhage from the lungs, often profuse. A severe chill, fol-

lowed by fever, may usher in the disease; in malarial districts this may simulate an attack of intermittent fever.

Fever is one of the earliest symptoms of pulmonary tuberculosis. It is irregular in course and remittent or intermittent; the latter points toward sepsis. It is highest toward evening (101° to 104° F.) and lowest in the early morning, when it may reach normal or nearly so. There is a "hectic flush" during the afternoon rise of temperature.

Night-sweats occur in most cases; perspiration is often very profuse. The pulse is somewhat increased in rapidity and soft. If there is mixed infection with pus microbes it is very rapid and feeble. The respiratory rate is also accelerated, but patients seldom complain of dyspnea, except late in the disease or after exertion.

Cough is usually the earliest symptom to excite alarm. At first it is dry and hacking. If there is laryngeal implication it is hoarse and ringing. Its intensity bears no direct relation to the intensity of the disease. It is often very troublesome at night. As the disease progresses it is associated with increased expectoration. This is at first scanty, but later becomes mucopurulent. In advanced cases the quantity raised may be enormous. It is usually greenish-yellow in color, contains coin-shaped or "nummular" masses and is often streaked with blood. Besides the pus-corpuscles, epithelial cells and occasional red-blood cells, the sputum contains elastic fibres from the alveoli or bronchi and numerous tubercle bacilli. The two latter are characteristic of tuberculosis. Coughing and expectoration frequently excite vomiting. If this is very common it adds to the difficulty of maintaining nutrition. Pain in the chest may also be excited by vomiting. It is usually due to the associated pleurisy.

Hemoptysis is a frequent symptom. Bonney (Med. News) in a study of 546 patients found that it occurred at the onset in 20 per cent. At this stage it is seldom dangerous, even though the loss of blood may be considerable. In the later stages of the disease, in which cavities have formed, the hemorrhage is not infrequently the cause of death.

Anemia is pronounced and gives a characteristic pallor to the

skin. There is no leukocytosis except in advanced cases, when there is mixed infection and suppuration.

Progressive loss of weight is one of the most prominent symptoms. The face becomes pinched, the features sharpened and the eyes sunken. The lips are cyanotic, the finger-nails bluish and curved or claw-like, and the ends of the fingers clubbed.

Loss of appetite, vomiting, indigestion and diarrhea are often troublesome. There may be a catarrhal or ulcerative inflammation of the bowels. Sometimes there is albuminuria. The mind remains clear and there is a characteristic hopefulness which often persists until the end.

PHYSICAL SIGNS.—The disease is divided into three stages, according to the progress of the morbid process—the first or incipient stage, in which there is commencing deposit; the second stage, in which there is complete consolidation; the third stage, in which there is softening and cavity formation. The physical signs during these stages are shown by the accompanying table:

	INCIPIENT STAGE.	SECOND STAGE.	THIRD STAGE.
INSPECTION.	Emaciation usually slight, often negative; the characteristic flattened and elongated chest; sometimes slight, flattening at the apex; prominence of the clavicle; diminished expansion of the affected side.	Emaciation more marked; respiration rate increased; hectic flush; supra- and infra-clavicular spaces depressed; marked flatness over affected area; limitation of motion.	Emaciation very marked; breathing and pulse increased in rapidity; flattening increased; decided limitation of motion.
PALPATION.	Often negative; sometimes diminished expansion and increased vocal fremitus.	Diminished expansion and increased vocal fremitus; thickened pleura or pleural effusions may obscure latter.	Diminished expansion and increased vocal fremitus; the latter absent over cavity if bronchus admitting air is obstructed, also over pleural effusions.

and circulation, mixed infection shown by chills and high fever, rapid loss of weight, laryngeal implication, the formation of large cavities which are poorly drained or have thin walls and hemorrhages occurring late in the disease.

FIBROID PHTHISIS.

ETIOLOGY.—Fibroid phthisis may be a sequel of pneumonia, of pulmonary tuberculosis or tubercular pleurisy. Very frequently it is caused by the inhalation of dust from coal mines, stone-quarries, or the grinding of metals.

PATHOLOGY.—This is a unilateral disease. It may be confined to one apex or invade the entire lung, which becomes shrunken, dense and resistant. The essential process is an overgrowth of fibrous connective tissue which crowds upon and replaces the air cells. Tubercles are usually abundant. Fibrous tissue may surround and encyst the cavities of a chronic ulcerative tuberculosis. Dilation of the bronchi is a result of the fibroid process. There is pleural thickening.

SYMPTOMS.—The symptoms are not so severe as those of chronic ulcerative tuberculosis. There is less fever; for long periods there may be none at all. Cough is troublesome but less persistent; it is often paroxysmal and large quantities of expectoration may be raised from a dilated bronchus. The sputum is often fetid and contains fat and Charcot's acicular crystals. There is often hemorrhage. The tubercle bacilli are less numerous and are often found with difficulty.

The patient is usually able to attend to his business. There is emaciation, but it is not rapid. When the fibroid condition develops in chronic tuberculosis there is often a decided improvement in the symptoms.

PHYSICAL SIGNS.—There is marked flattening and restriction of motion upon the affected side and a complicating emphysema of the opposite lung. The heart is hypertrophied and carried toward the diseased side.

Percussion shows impaired resonance and finally complete dulness. Upon auscultation there is bronchial breathing and often pectoriloquy. A large dilated bronchus may give the physical signs of a cavity.

PROGNOSIS.—Very chronic, often persisting for twenty or thirty years.

TREATMENT OF TUBERCULOSIS OF THE LUNGS.—*Prophylaxis.*—Children belonging to tuberculous families should receive special care in order to insure them well-nourished, healthy bodies. Plenty of simple food, unpampered appetites and outdoor life in fresh, pure air and sunshine are of first importance. Systematic gymnastic and breathing exercises may be used with profit to supplement the harmless outdoor sports of childhood. These patients should be taught to stand erect and the faulty shape of the thorax corrected by persistent exercise. Knopf lays special stress upon thorough or forced expiration to relieve the defective condition of the apices and prevent stagnation and congestion. Adenoids or other nose troubles which obstruct the free entrance of air to the chest should be removed.

With the knowledge that consumption is a communicable disease comes the necessity for individual care. The chief danger is in the sputum, which when dried may remain virulent for months and be inhaled from the dust of houses, stores, workshops, streets, cars, etc. The patient should be instructed to expectorate into a covered spittoon or if confined to bed into a metal spit-cup containing a pasteboard box which may be removed and burned, or into a Dettweiler's or Knopf's sputum flask, which may be carried in the pocket, concealed in the handkerchief, and sterilized by boiling water. In lieu of these he may use squares of muslin or linen to collect the sputum; these should be burned when soiled. In coughing or sneezing the face should be protected in order to prevent particles of sputum from flying. At the table he should always have his individual napkin and utensils, which should be used by no one else until they are sterilized or washed in hot water. The patient should always sleep alone and occupy a room by himself. Carpets and upholstered furniture are to be avoided. The floors should be wiped up and not swept and thoroughly disinfected before being occupied by another.

The danger of tuberculous food should be kept in mind. This is thought to be a prolific cause of the disease, especially in children who depend upon milk for food, though much doubt has been thrown upon this as a factor by various authorities. Koch

has been unable to infect cattle with the human tubercle bacilli and thinks man does not contract the disease from animals.

A larger degree of control over the large number of consumptives in every community, and especially in the large cities, should be exercised by the health authorities. All these cases should be reported and put under supervision, and the public should be educated as to the danger of disseminating the disease and the methods of preventing it. Spitting ordinances should be enacted and enforced. Consumptives should never be allowed to work in crowded shops or factories where they may endanger others or at occupations where the manufactured product is likely to be infected, as in making cigars, clothing, handling food, etc. The necessity for the segregation of the tubercular poor in proper institutions where they may cease to be a danger to others and have a fighting chance for recovery is urgent.

Climate.—The value of a suitable climate has long been recognized. In general the patient should select a locality where he can obtain (1) pure air, (2) an equable climate without extremes of temperature—such as to permit a maximum of outdoor life, (3) an abundance of sunshine and (4) facilities for securing nutritious food. Where the patient's means prohibit the ordinary comforts of life he is likely to do better at home. There is some difference of opinion as to the value of altitude and dryness, but in general it may be said that patients in the earlier stages, free from complications and not advanced in years, do better in a dry climate at a moderate altitude (1,500 to 5,000 feet), as in Colorado, New Mexico, the California foothills, the Adirondacks, Arizona and western North Carolina. Patients with compensated heart troubles and slight early hemorrhages may also seek a moderate altitude. Neurasthenic cases, cases associated with tachycardia or dilated heart, most hemorrhagic cases and those far advanced do best at a low altitude, as Florida, southern Georgia, South Carolina or southern California. Acute cases and those in the last stage of the disease should be kept at home.

Sanatoriums.—The wonderful possibilities of the sanatorium treatment of consumptives were early shown by Dr. Hermann Brehmer, who opened the first institution of this kind in Germany in 1859, but it was not until 1884 that the work was

taken up in this country by Dr. E. L. Trudeau at the Adirondack Cottage Sanatorium. The first state institution in America was opened at Rutland, Mass., in 1898, and owes its existence to the energy of Dr. Victor Y. Bowditch of Boston. Other states are rapidly taking up the work and numerous private institutions have been opened; Knopf in his recent work names thirty-five in this country. Undoubtedly the best results are obtained in sanatoriums, where the patient's habits, exercise, diet and treatment are under the constant supervision of skilled medical men. Even where the locality possesses no marked climatic advantages the hope of recovery is greater than when the patient is left to his own resources, however favorable the climatic condition. It is to be hoped that sufficient state provision will soon be made for the poor.

Hygiene.—The patient should be made to realize that his recovery hinges upon the care with which he obeys the detailed directions as to his daily life given by his physician. When he must remain at home the house (if this is a matter of choice) should be situated on high, dry ground, protected from strong winds and having a southern exposure. Too much shade should be avoided; sunshine is inimical to germ life and should have free access to the living rooms and especially to the bedroom of the patient. This, as already stated, should be uncarpeted, light rugs being put upon the floor if desired, and the furniture should be without upholstering. The bed should have good springs, a hair mattress (feathers are an abomination) and the bed clothing should be frequently changed. "Comforters," quilts or other unwashable bedding should never be used. Free access of air to this room is of the utmost importance. During the night a window should be always open—wide open in most temperatures. The days should be spent out of doors.

The clothing should be warm but not unnecessarily heavy. Underclothing should be of woolen or linen mesh; the wearing of second suits of underwear should be discouraged, necessary warmth being supplied by the outer garments and variations of temperature met by changes of their weight. "Chest-protectors" should be forbidden and muffling of the neck and face discouraged. The clothing should never be tight about the neck, abdomen or chest. Corsets are usually harmful.

The feet should be kept dry and warm by wearing shoes with a broad last and thick soles. The teeth should be brushed every morning and the mouth and nose washed out frequently with an antiseptic spray of the listerine class. This may be profitably followed in many cases by eucalyptol, thymol, menthol or some similar aromatic antiseptic in an oily nebula.

Diet.—We wish to emphasize this fact—that the most important factors in the treatment of consumption are (1) *food*, (2) *rest* (in the acute stage) and (3) *fresh air*. The diet should, as far as possible, consist of food to which the patient has been accustomed; it must, however, be suited to the condition of his digestion and sufficient in quantity to maintain nutrition. He should, in fact, be urged to eat all that he can digest, even though the desire for food is absent. By this means, alone, is it possible to maintain the resisting power of the organism against the encroachment of the disease. Knopf gives the following advice: "The patient should have an abundance of proteids, carbohydrates, and fats, but in proper proportion; thus the menu for a tuberculous invalid should be varied. He should never have a diet exclusively of meat, nor of vegetables; a mixed diet, with some eclecticism as to the more digestible substances, should be the rule. Meat, milk, fat, eggs, vegetables, bread (cereals), fruits, especially grapes, should all contribute to the diet of the patient. To eat a great deal of butter and cream is especially to be recommended to pulmonary invalids, and milk should be allowed at any time without restriction. However, some patients, in their eagerness to get fat, overdo in this respect. When drinking numerous glasses of milk between meals interferes with the proper appetite at meal-times, the number of glasses should be reduced accordingly."

Osler (Maryland Medical Journal) relates an illustrative case in which remarkable improvement followed sitting, "bundled up" upon the porch through cold winter weather and a diet of raw eggs, commencing with three a day and increasing to a maximum of fifteen—this in addition to the three meals in which she got cream, toast, oatmeal, meat, vegetables, bread, milk, etc. Desserts were not eaten. Dr. Osler says that "overfeeding or stuffing, when possible, should be practiced and the patient should be encouraged to pay as little attention to his

subjective gastric sensations as possible." Raw eggs are his favorite food and should be taken in considerable number. "It is most important to get the patient accustomed to taking the natural foods. Milk, cream and butter, meat and eggs and oysters should constitute the main part of the diet."

Rest and Fresh Air.—Dr. Brehmer in his sanatorium at Goerbersdorf laid great stress upon exercise, holding to the opinion that the heart in consumptives is small and the pulmonary circulation defective. Later authorities, however, lay down the dictum that exercise is absolutely contraindicated so long as there is decided elevation of temperature. *Rest in the open air is now considered of the greatest importance in treating the active stage of the disease.* This is required summer and winter, the patient being placed in a suitable reclining chair and kept warm during cold weather by heavy coverings or furs. He is kept out of doors through practically all the hours of sunshine. Osler cuts off two hours in the morning and one at night; the balance of the time he is outside, except upon rainy or windy days. A veranda with a southern or western exposure is a good place, or a covered platform may be made in the yard. Here the patient should recline. He can amuse himself by writing or reading. Knopf thinks it better to relieve the tedium of this position, the artificial heat of the back caused by prolonged lying in one position and the tendency to hypostatic congestion of the lungs by taking simple respiratory exercises several times a day.

We have already referred to the necessity of admitting an abundance of fresh air to the sleeping room at night. This must be done, in spite of the popular prejudice against night air still to be found in some quarters. C. S. Millet (Maryland Medical Journal) keeps his patients out of doors at night also. He reports a number of interesting cases where excellent results followed this plan of treatment. Elevated platforms were built, accessible from the second story of the patient's home, or upper balconies used. These were uncovered and here the patient slept in all suitable weather. Dr. Millet thinks the terms "dampness" and "draughts" are bugbears. No harm was produced by dew or even, on one occasion, by a light summer rain. Besides

improvement in all other symptoms, these patients gained each from twelve to twenty-two pounds in weight.

Exercise.—Active exercise is contraindicated so long as there is an evening temperature above 99½ to 100° F. If it is below that point the patient may be allowed to take short walks. If these produce no elevation of temperature they may be grad-

FIG. 12. DR. MILLET'S ROOF GARDEN (*Maryland Med. Journal*).

ually increased. Exhaustion, tachycardia or rise of temperature indicate that the effort is too great. Knopf lays great stress upon the value of respiratory exercises, which may be taken (gently) even when the patient is undergoing the rest treatment. These are simple. The first consists in slowly raising the arms from the side laterally until they are horizontal, meanwhile drawing in the breath; they are then slowly dropped during expiration. In the second exercise the arms are raised to a vertical position, breathing being as before. In the third, the arms are extended in front of the body as in swimming, with the backs of the hands together. They are then carried slowly back behind the back, while taking a deep inspiration; during expiration they are brought back. A fourth exercise,

used to straighten up a stooped-shouldered patient, consists of putting the hands upon the hips with the thumbs forward and bending slowly backward as far as possible. This is done during inspiration; the process is reversed during expiration. Dr. Knopf lays special stress upon forced expiratory effort at the close of the exercise to expel the reserve air. These exercises are simple, easily learned and effective. The patient should not be allowed to overexert himself, however, in learning or using them. The use of Dr. Denison's respirator, to be described later, will be useful for respiratory exercise.

Hydrotherapy.—Probably next in importance, after fresh air, rest and diet, is hydrotherapy. According to Kellogg (Medical News) cold applications to the skin act as a substitute for cold air and exercise without the disadvantages of the latter, viz., elevation of temperature and increase of tissue waste. Cold water applied to the skin, judiciously, not only reduces fever, but improves the action of the heart, raises the blood pressure, increases secretion and excretion, and improves nutrition. It deepens respiration, antagonizes the debilitating effects of heat, lessens the susceptibility of the skin to changes of temperature, tones up the nervous system—in fact, acts as a "physiological tonic." The methods used by Dr. Kellogg include: (1) Dry friction twice daily of the whole surface of the body with the hand protected by a mitt, until the part is warm, followed by friction with the hands dipped in water at 60° F., this temperature being reduced until ice water is used; (2) cold wet friction with the friction mitt, with water at the same temperature, applications being made to small areas of skin in succession, each being rubbed until red; (3) the wet rubbing sheet at 60° F., gradually reduced to 50°. This is made in the morning before arising, after which the patient may exercise for fifteen or twenty minutes or return to bed if reaction is slow. If the patient's temperature in the morning is subnormal he should be first artificially warmed by friction or some form of hot bath; (4) the warm douche (100° F.), followed by the hot (110° to 120° F.), then by the cold (60° F.) douche, after which the patient should be wrapped in a Turkish sheet and dried by the attendants.

The hydrotherapeutic methods of Von Ruck (Journal of

Tuberculosis) are similar but perhaps somewhat simpler. He employs the cold rub, the shower or cold full-bath, commencing with temperature at 90° F. and gradually reducing it to 65° to 50°, according to the reactive powers of the patient. The cold shower is only used upon strong, vigorous patients; such can usually commence with the full bath, immersion being for a few seconds only. In all forms friction must follow. The cold rub may be given to nearly all. Dr. Von Ruck says: "In the absence of a bathtub, and to delicate, badly nourished patients, the cold rub should be given instead of the full bath, beginning with the temperature of the water also at about 90° F. and reducing it at subsequent applications the same as with the full bath. The large basin or bucket of water, of the desired temperature, is placed conveniently near the bed, and having removed the body linen, the patient is covered with a woolen blanket. The water is applied with a bath-glove made of several thicknesses of bath toweling, with the hand in it, it is dipped into the cold water and squeezed out, so that it will not drip. The patient projects first one arm and then the other from under the cover, the cold wet glove is quickly rubbed up and down, and the part is rubbed dry immediately. Next, the cold water is applied to the chest and abdomen, and in like manner to the thighs and legs, and finally to the back, each part being rubbed warm and dry, while other parts remain under cover of the blanket."

Whatever hydrotherapeutic method is used, the patient must be accustomed to it, either (1) by gradually reducing the temperature of the water, or (2) by making cold applications to only a portion of the surface at a time. Contraindications to cold are a subnormal temperature, great weakness of the heart, marked tendency to hemorrhage, aggravation of the symptoms and great general weakness.

The Pneumatic Cabinet.—This is a mechanical apparatus designed to imitate the rarified atmosphere of high altitudes. It consists of an elongated box or cabinet with a glass window in front, made as nearly air tight as possible and large enough for the patient to sit comfortably inside. The air is exhausted with a pump while the patient breathes through a tube connecting with the outside by means of a suitable mouth or nose piece.

The effect of this is to reduce the atmospheric pressure upon the surface of the body, increase the bulk of the air-cells and draw the blood out of the lungs into the general circulation, thereby reducing pulmonary congestion. It is considered a very valuable method of treatment, but must be used under the direction of the physician and is seldom available for daily use except in a sanatorium or hospital.

Phototherapy.—The germicidal effect of sunshine has long been recognized, and it has more recently been shown that light penetrates the tissues. Finsen of Copenhagen has utilized these facts by using the actinic rays of the sun or the electric light in the treatment of lupus, and with remarkable results. Dr. J. W. Kime of Fort Dodge, Iowa, has extended the method to treatment of tuberculosis of the lungs. The patient is stripped to the waist and the light thrown with a large reflector upon the chest and sides. Few cases have as yet been reported, but the method gives promise of value.

Serum-Therapy.—The use of Koch's tuberculin, except for diagnostic purposes and in the treatment of lupus, has proven disappointing. The same may be said of Koch's new serums, T O and T R, and of the numerous modifications which have been offered. They are still used by some physicians and with asserted good results, but these are no better than those of sanatorium treatment minus these remedies.

Medicinal Treatment.—Cod-liver oil has long been esteemed of peculiar value in phthisis. Primarily it is a food, but it seems to have something more than a food value. Its rather unpleasant fishy taste makes it distasteful to some patients, but it seldom really disagrees. When it causes eructations or gastric disturbance its persistent use does more harm than good. The pure Norwegian oil is usually the best preparation. The beginning dose should be one teaspoonful three times a day; this should be increased to a tablespoonful. Tyson gives it as follows: A little whisky is placed in a wineglass, the oil floated on top of it and a little more whisky added. The whole is then swallowed at a gulp. Knopf recommends Bricemoret's mixture:

Cod-liver oil .....oz. 12
Syrup tolu .....oz. 6
Tincture tolu .....gtt. 12
Oil cloves .....gtt. 2
Shake and take a tablespoonful three times a day.

For those that prefer them there are numerous elegant proprietary preparations. The malt preparations are useful nutritives and may be combined with cod-liver oil, the hypophosphites, iron, etc.

Creosote and its derivatives still hold the first place in the medicinal treatment of pulmonary tuberculosis. Whether or not it has any bactericidal action still remains something of an open question, but it is probable that its good results depend upon the improvement of appetite and digestion and the better nutrition that follows its use. It certainly diminishes the secretion and modifies the severity of the cough. It is usual to begin with one or two drops three times a day and increase to eight or ten drops at a dose. Some give it in massive doses, sixty to ninety drops or even more daily. It should be given after meals. It may be administered in milk, hot water, sherry wine or with gentian and wine. Whittaker commences with five drops of a mixture of equal parts of nux vomica and creosote in wine, increasing both these drugs as required. An excellent way to give it is with cod-liver oil, in soft gelatin capsules if preferred. If the drug disturbs the stomach it must be stopped. Creosote in oily solution (1 part in 15) has also been given by subcutaneous injection in large quantities. The following is a sample prescription for internal use:

Creosote (beechwood).....dr. 2
Glycerin .....oz. 1
Brandy .....dr. 6
Tincture gentian .....oz. 3
Comp. tinct. cinchona.....oz. 3
Teaspoonful four times a day after meals. Each time the mixture is repeated, a dram of creosote is added, until 1 oz. is prescribed. The patient thus commences with 2 minims per dose and reaches 8 minims.—W. J. Robinson.

Creosotal (creosote carbonate) is less likely to disturb the stomach than creosote and answers the same purpose. The dose is 5 or 10 drops three times a day; it may be increased to 30

drops or more at a dose. Two drams daily is a fair quantity. It is best taken in hot milk or in emulsion with cod-liver oil.

Guaiacol is another remedy of the same class as creosote and of similar taste and smell; it is, however, less irritating to the stomach. It is given in the same manner as the preceding, commencing with five drops three times a day and increasing. With cod-liver oil and creosote it may be prescribed as follows:

Guaiacol	dr 4
Creosote	dr. 2
Cod-liver oil	pt. 1
Oil cinnamon	dr. 2
Oil bitter orange	m. 30

Teaspoonful three times a day for the first week, two teaspoonfuls during second week, three during third week, and four during fourth week. Continue latter dose if stomach remains unaffected; otherwise reduce to two teaspoonfuls three times a day.—Fasano.

Weil and Diamardberger use it in large doses, both internally by subcutaneous injections and externally by poultices to the chest. The mixture used by them for hypodermic injection contains:

Guaiacol, crystallized	Gm. 10
Sweet oil almonds (sterilized)	Gm. 10
Cocain hydrochlorate	Gm. 0.20

Inject 1 cubic centimeter daily into the gluteal region.

Guaiacol carbonate (duotal) is also used. It has not the disagreeable odor of guaiacol and creosote. Ichthyol has been warmly praised by Moritz Cohn. It is said to reduce the sputa, diminish night-sweats, increase the weight and improve the general condition. Four drops of a solution of ichthyol in an equal bulk of water are given three times a day, well diluted in more water, and increasing by one drop daily until 25 drops per dose are reached (half as much in children). It is given before meals, in from one to four ounces of water, with a draught of black coffee or lemonade following. It causes no gastric disturbance. Goldmann (Riforma Medica) recommends a combination of guaiacol and ichthyol.

Guaiacol carbonate	gr. 225
Ichthyol	gr. 225
Glycerin	min. 600
Peppermint water	min. 150

Twenty to thirty drops daily.

Next in value to the creosote class are the *iodin preparations*. These include iodoform, europhen and iodol. Iodoform may be given internally in capsules or pills with gentian, nux vomica or other tonics in doses of 1 to 5 grains three times a day, by inhalation or by inunction. The latter method is considered particularly valuable by Flick, who considers inunctions of europhen in olive oil practically a specific in the very early stages of tuberculosis. The Shurley-Gibbes method of treating tuberculosis by injections of iodin was much in favor a few years ago. Squier (Shoemaker's Materia Medica) modifies their plan, using the following formula:

Eucalyptol	min. 22
Guaiacol	min. 16
Iodoform	gr. 8
Iodin	gr. 4
Sweet almond oil	oz. 1

Ten to thirty minims to be injected daily or alternating with gold and sodium solution.

Thiocol (guaiacol sulphonate of potassium) is one of the newer drugs of the creosote series. Its dose is 5 grains, increased.

Extract kalagua is another new drug which seems to promise well. The dose is 9 to 20 grains daily.

Mays, believing that a nervous pathology underlies pulmonary consumption, depends largely upon hypodermic injections of silver nitrate over the course of the vagi in order to stimulate them into renewed activity. "Four to seven minims of a 2½ per cent solution of silver nitrate (Merck's) answered well, though sometimes five minims of a 5 per cent solution were required to bring about an inflammatory reaction. The point of injection is immediately over or behind the carotid artery, half-way between the angle of the jaw and the clavicle. To avoid puncturing either the carotid or jugular vein the skin is to be elevated and the needle introduced just beneath it. Cocain injection (2½ per cent) should precede the above, for the nitrate of silver is otherwise very painful. The same puncture suffices for both injections, the barrel of the syringe being removed, cleaned, and filled with the silver solution, the needle remaining *in situ*. A diffuse swelling, with redness and pain,

appears. The injection is to be given on the side of the neck on which the affected lung is situated, and should be repeated in a week or ten days, unless the first injection is followed by too much irritation. Generally it is best to limit the injections to the affected side, with an occasional one on the opposite side." An experience with a large number of cases treated in this manner has convinced him of its efficiency.

Tonic medication with the bitter tonics and iron, strychnin and arsenic is indicated in many cases of tuberculosis and should be prescribed according to the individual requirements of each patient. Arsenic is peculiarly valuable in promoting nutrition and may be given with benefit in most cases. A form of arsenic known as sodium cacodylate has attracted a great deal of attention in France during the past year and has produced, it is asserted, remarkable benefit in tuberculosis. The dose is 1 to 1½ grains hypodermically and 3 to 6 grains by the mouth. Strychnin is to be used in all cases showing lack of nervous tone or cardiac debility. Dr. William Porter of St. Louis says that in view of the small, weak heart of most tuberculous patients, it is good practice to add to other medication a little digitalis and strychnin. This may also explain the benefit produced by alcohol, which is useful in most stages of the disease.

Landerer has used sodium cinnamate extensively and claims good results. It is used by intramuscular or intravenous injection, commencing with 1 milligram and going up to 50 milligrams, used in 5 per cent solution. It causes hyperleukocytosis and encapsulation of the tubercles by connective tissue growth. It must be continued for at least three months. Maguire has recently used intravenous injection of formalin (50 Cc. daily of a 1 to 2000 solution). A unique method of treatment proposed by Mendel (Jour. des Practiciens) consists of the tracheal injection, with a long curved syringe, of essential oils.

Counter-irritation with small cantharidal blisters, croton oil or tincture iodin is useful in the early stage of pulmonary tuberculosis. Knopf advises ignipuncture. For neuralgic pains Shively (Phila. Med. Jour.) advises a small cantharidal blister and rubbing the chest with the following liniment:

Menthol .....dr. 3
Chloroform .....dr. 3
Chloral .....oz. ½
Camphor .....dr. 3
Alcohol, enough to make.....oz. 4

Dr. J. B. Murphy at the Denver meeting of the American Medical Association proposed a method of treatment, consisting of *intra-pleural injection of nitrogen gas* upon the affected side in order to collapse the diseased lung and put it at rest. While good results have followed in some instances, it has not realized the expectations which were placed in it. Pleural adhesions undoubtedly limit its efficiency. It is, however, of undoubted benefit in some cases, notably those associated with hemorrhage.

The inhalation of medicated vapors and nebulae has undoubted value in the treatment of pulmonary tuberculosis, at least modifying some of the more distressing symptoms as bronchitis, cough, expectoration, etc. H. M. Thomas (Transact. Miss. Valley Med. Ass.) has elaborated this treatment, using air compressed to thirty-six pounds to the square inch, warmed in cold weather. There are a number of excellent compressed air apparatuses on the market which may be used. Creosote, chloroform, the essential oils, the balsams, iodin and iodoform are the drugs most employed in this manner. They are usually combined with liquid petrolatum. The following formulas are in common use:

Creosote (beechwood) .....m. 20
Menthol .....gr. 10
Chloroform .....dr. 1
Oil pinus sylvestris.....dr. 1
Oil eucalyptus.....dr. ½
Liq. petrolatum, enough to make.....oz. 2

Or—

Creosote (beechwood).....m. 20
Oil eucalyptus .....dr. 1
Oil pinus sylvestris.....dr. 1
Liq. petrolatum, enough to make.....oz. 2

Or—

Oil eucalyptus .....dr. 1
Oil cassia .....dr. 1
Creosote (beechwood).....dr. 1
Oil tar .....dr. 1
Liq. petrolatum, enough to make.....oz. 4

Or—

Oil eucalyptus	dr. 2
Oil pinus pumilio	dr. 2
Oil tar	dr. 2
Creosote (beechwood)	dr. 1
Camphor	dr. ½
Tinct. benzoin, enough to make	oz. 4

Or—

Camphor	dr. 1
Oil tar	dr. 2
Iodin (crystals)	gr. 20
Creosote (beechwood)	dr. 1
Menthol	gr. 30
Balsam Peru	dr. 1
Tinct. benzoin, enough to make	oz. 4

Dr. Charles Denison of Denver has devised a convenient little inhaler which may be carried by the patient or worn constantly if desired. This inhaler in addition to the local effect of the antiseptic has the advantage of requiring *expiration against pressure,* thereby dilating the air-cells and filling out the apices. The balsamic antiseptics are mainly used, in a variety of combinations. J. Lardner Green (British Medical Journal) praises formalin as an inhalant. He uses the following mixture four to six times daily:

Formalin	dr. 1
Glycerin	dr. 4½
Water	oz. 5

If the air passages are unusually sensitive he adds 10 minims of aromatic spirits of ammonia. It has been suggested that this makes a physiological incompatibility. To make it more agreeable to the patient we suggest combination with eucalyptol, menthol or compound tincture benzoin. The above formula can be used in the Denison inhaler.

Treatment of Special Symptoms.—*Cough.*—Opium or its alkaloids is usually required, but is to be given in as small an amount as possible. Tyson recommends that the patient be allowed to cough in the morning in order to get up the accumulated mucus and if there is a cavity gives a tablespoonful of whisky or a milk punch to aid expectoration. Yonge (Therapist) suggests for the same purpose a glass of hot milk or a cup of hot water to which 15 grains of sodium bicarbonate has

been added. Codein (¼ grain) and heroin (1/12 grain) are the least harmful of sedatives. They are best given in syrupy or glycerin solution. Murrell recommends the following prescription:

Codein	gr. 4
Dil. hydrochloric acid	dr. ½
Spts. chloroform	dr. 1½
Syrup lemon	oz. 1
Water, enough to make	oz. 4

Teaspoonful when cough is troublesome.

The inhalation of sedative vapors often decidedly relieves irritation and cough. Kellogg recommends cold applications to the chest.

Hemoptysis has been elsewhere discussed (see Hemoptysis). A position of semi-recumbency, perfect quiet, ice or cold compresses to the chest, morphin and ligation of the limbs are the usual modes of procedure. Nitroglycerin is recommended. If loss of blood has been considerable, enteroclysis with hot saline solution is indicated. Gallic acid and ergot are principally used as astringents. Nitrogen gas injections are useful in cases prone to hemorrhage. Answering the same purpose are Denison's traction plasters, so constructed as to compress the diseased side only and limit the movement of the lung.

Night-Sweats.—The patient should wear a flannel night-gown. Knopf says that he should take a glass of cold milk and cognac before retiring. A light lunch should be at hand if he wakes in the night feeling faint. A cold compress (55° F.) is applied to the apices and thorax and kept in place during the night with a flannel bandage. Kellogg recommends sponging with hot water; others with alcohol, vinegar, lemon juice, etc. Atropin (1/100 grain) is a reliable remedy. Agaricin (1/12 to 1/6 grain) is preferred by Yonge (Therapist) and does not have the disagreeable after-effects of atropin. Camphoric acid (20 to 30 grains in capsule at bedtime) is highly recommended. Picrotoxin is given in 1/60 grain doses. Potassium tellurate at night in grain doses may be effective. Hirschfeld uses formalin in the following lotion:

Formaldehyd	oz. 2
Absolute alcohol	oz. 2

External use. Apply on a swab.

Only one part of the body is treated at one sitting; the shoulders and arms, for instance, on the first day, the lower extremities on the day following, and the trunk on the third. From 1 to 2½ drams of the solution is used each time.

Appetite and digestion are often improved by the use of the bitter tonics. These may be combined with creosote as already directed. Hydrochloric acid is useful in fermentative dyspepsia. Orexin is a valuable stimulant to the appetite.

Vomiting is frequently relieved by small doses of calomel and soda. Chloroform water and menthol and cracked ice are also useful. When nervous, the bromids may be used; if reflex, the pharynx may be painted with 2 per cent solution of cocain. If caused by cough, the treatment should be addressed to the relief of this condition.

Diarrhea calls for regulation of the diet and antifermentatives and antiseptics, especially if it is caused by intestinal ulceration. Salol, beta- and benzo-naphthol, zinc sulphocarbolate and large doses of bismuth subnitrate or subgallate are the indicated drugs. Tannic acid, tannigen, tannopin, acetate of lead and other astringents may be required. Sometimes opium is necessary.

TYPHOID FEVER; ENTERIC FEVER.

DEFINITION.—An acute infectious disease caused by a specific germ, the bacillus typhosus, and characterized by a definite course, a typical range of temperature, a peculiar rose-colored eruption and morbid changes in the lymphoid structures of the intestines.

ETIOLOGY.—The specific cause of typhoid fever is the bacillus typhosus, discovered by Eberth in 1880. This is a short, thick rod with rounded ends. It enters the body by the alimentary tract in food or drink which has been contaminated with excreta. While the disease is in most cases transmitted by drinking-water, it has been shown that there may be wide-spread infection by means of food. Vaughan, as a result of a careful study of the epidemic of the disease in the United States armies during the Spanish-American war, concluded that flies were responsible for the transmission of the germs from uncovered fecal matter to food in most of these cases, and that water was not an important

factor in its spread. While special emphasis is usually laid upon the danger of fecal contamination, too little importance is given to that from infected urine. Since typhoid bacilli are present in the latter in from 20 to 30 per cent of the cases, it is probable that it is a prolific cause of contamination of water courses and wells. In one case reported by Gwyn there were 500,000,000 bacilli per Cc. of urine, enough to infect a county. Food may also be infected by contact with an infected person, or by street dirt. The bacilli frequently are conveyed in milk, or upon meat or fruits exposed for sale and by oysters fed upon sewage.

Typhoid fever occurs most frequently in the temperate zone, but is not confined to it. It is most prevalent in the late summer or early autumn, especially after a dry season. Improper sanitation, uncleanliness, defective sewage-disposal, poor plumbing, overcrowding in asylums or hospitals and prolonged camp-life among soldiers predispose to the disease. No age is exempt. Some persons are more susceptible than others. Persons coming from city to country are more likely to contract the disease than permanent residents.

PATHOLOGY.—The characteristic lesions of typhoid fever are found in the intestines. The solitary glands and Peyer's patches, especially the latter, are attacked by the typhoid bacilli, which burrow into the submucosa. The glands become infiltrated with leukocytes, swollen and their vessels dilated; they are grayish in color and protrude into the lumen of the bowel. Any portion of the intestine may be attacked, but the Peyer's patches in the lower portion of the ileum are most likely to suffer.

In a week or ten days the glands become necrotic; this is due to the choking of the nutrient blood-vessels and to the direct influence of the typhotoxin. During this destructive process vessels are sometimes eroded, causing hemorrhage which may be profuse if an artery of considerable size is destroyed. The necrotic tissue sloughs away and forms an ulcer having irregular, overhanging edges. Usually this ulcer does not invade the muscular layer, but it may penetrate it and even the peritoneal layer, causing in the latter case a perforation. This is followed by peritonitis.

Repair is usually rapid. The ulcerated area heals from the

edges, connective tissue replaces the structures which have been destroyed and a new layer of epithelium covers it. There is seldom any cicatricial contraction.

The mesenteric glands are always involved; they become hyperemic and swollen, sometimes enormously so, but seldom suppurate. The spleen is enlarged in practically all cases; its structure becomes soft and pulpy.

There are also degenerative changes in the liver, kidneys and muscles, and the heart, arteries, lungs, pleura, larynx, pharynx, peritoneum, bladder, organs of special sense, and nervous system frequently show the presence of complicating disorders.

While the pathologic changes described are those usually found, they are by no means constant. Cases have been described by a number of observers in which intestinal lesions were entirely absent and yet were, nevertheless, indubitably typhoid. We now know that the changes in the lymphoid structures of the bowel are but one local manifestation of a general infective process. The bacilli are found in the blood, in the gall-bladder, spleen, liver, kidney, bladder, the bone-marrow, the lungs, the rose-colored spots and in other portions of the body. They are present in feces and urine in a large proportion of cases; occasionally in the sputa, sweat and vomitus.

Symptoms.—The *period of incubation* is two or three weeks. During the prodromal period there is loss of appetite, a sense of increasing weariness or fatigue upon exertion, headache, pains in the back and limbs, occasional nosebleed, sometimes diarrhea and slight evening feverishness.

Increasing Stage.—The active symptoms sometimes appear abruptly, being ushered in by a chill or chilliness; at other times they come on so gradually that the patient is unable to state when the disease actually commenced. The sense of malaise is now increased, there is severe frontal headache and frequently nosebleed, nausea, vomiting and diarrhea. The tongue is covered with a whitish fur, but its edges and tips are red and the papillae prominent. Toward the end of the first week the abdomen usually becomes distended and somewhat tympanitic. The pulse is somewhat accelerated (85 to 100) and full; later it becomes dicrotic.

The course of the fever is characteristic. During the first

four or five days it rises from day to day, dropping every night only to go still higher the following evening. In this way the temperature each day is from one to two degrees higher than the preceding day and there is also a variation between the morning and evening temperatures of one to two degrees. This gives it a characteristic "step-ladder" course. By the end of the first week the acme of the fever, or fastigium, is reached.

Stationary Stage or Fastigium.—Throughout this stage the temperature remains high (104° to 105° F.), but the daily morning and evening variation continues. The pulse is rapid, compressible and dicrotic. There is no leukocytosis. About the eighth day of the disease the eruption appears. This consists of rose-colored spots, resembling flea-bites, slightly elevated above the surface and disappearing upon pressure. They are usually few in number (5 to 10), though in rare cases they may be very numerous. They are found most frequently upon the abdomen and chest. They come out in crops, each crop lasting two or three days, the whole course of the eruption being about ten days. Morbilliform and scarlatiniform rashes have been noted by Da Costa. Herpes is absent. During this period of the disease the nausea and vomiting cease, but the other symptoms become more severe. The patient grows feeble, the voice is weak, the tongue tremulous, there is twitching of the tendons and slight deafness; he is apathetic, pays little attention to what is going on around him, perhaps is semi-unconscious or comatose and at times there is low muttering delirium rarely becoming violent. The bowels may remain loose or there may be constipation. Abdominal tenesmus and tenderness is often marked and great meteorism is present in some severe cases, due to paralysis of the bowel caused by extensive ulceration. The stools are usually offensive, thin and yellowish, like "pea soup." The tongue becomes dry and brown and the teeth are covered with sordes. Often there is excessive sweating. The urine is decreased in quantity, is of high specific gravity and may be albuminous. In very severe cases there is incontinence of feces and urine. There is slight cough due to associated bronchitis. In favorable cases during this stage the fever begins to decline. This stage lasts one to two weeks.

Stage of Decline.—Usually the temperature commences to

decline toward the end of the third week or the beginning of the fourth; the morning remissions are at first more pronounced, the temperature finally becoming remittent and then normal. The process is a reversal of the increasing stage. There is a corresponding improvement in the other symptoms. The tongue becomes moist, the appetite improves, delirium disappears, the volume and regularity of the pulse returns and there is a decided gain in strength. The usual course of the fever, in favorable cases, is four weeks. In very mild cases it may last but three weeks; very frequently it is prolonged to six.

Convalescence is slow owing to the extreme prostration. Often it is interrupted by *relapses,* during which there is a return of the fever and other symptoms. These relapses are due to reinfection and are usually induced by indiscretions of diet, constipation, too early exertion or nervous shocks; in most cases they terminate in recovery. A *recrudescence* is a temporary return of the fever, without other symptoms, occurring during convalescence.

VARIETIES.—*Mild Typhoid.*—The symptoms are mild. The temperature does not run high and there are often decided remissions; delirium is usually absent; the eruption may be present or absent; the course is often shortened to three or even two weeks; the spleen is enlarged. This type frequently occurs in young children.

Abortive Typhoid.—In this form the symptoms are severe at the onset but the fastigium is very short and recovery occurs in two weeks or less.

"Walking" Typhoid.—The onset is gradual and mild and the patient keeps about his work until the disease is fully developed. These cases often end fatally from complications (hemorrhage or perforation).

Afebrile Typhoid.—The characteristic symptoms of the disease are present *minus* the fever. It is very rare.

Grave Typhoid.—There is very high temperature, early stupor and delirium and other evidences of profound toxemia. Complications of the lungs, kidneys or nervous system are sometimes prominent. They are usually fatal.

COMPLICATIONS.—Hemorrhage is a serious complication occurring in 5 to 10 per cent of the cases. Thirty to forty per

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cent of these die. It usually appears during the third week. A quart of blood may be lost at one time or there may be a succession of small hemorrhages. Blood may not appear in the stools for some time after the occurrence of hemorrhage, in which case the symptoms will be marked. The symptoms include pallor of the skin, faintness, dyspnea and a rapid, feeble pulse. The temperature falls and the accompanying nervous symptoms may temporarily disappear.

Perforation is a very grave complication, usually ending in death. It occurs in 2 to 3 per cent of the cases, usually at the end of the third or the beginning of the fourth week. There is sudden, severe abdominal pain, the temperature becomes subnormal, the pulse is rapid and thready, the skin cool and covered with beads of perspiration and there is vomiting. Peritonitis follows. This condition may also be produced by extension of the inflammatory process without perforation.

Pneumonia may precede typhoid fever or occur as a complication during the latter part of its course. It may be lobar or lobular. Malaria and typhoid fever probably (though rarely) coexist. The existence of a mixed disease, known as typho-malarial, is no longer admitted by good authorities. Thrombosis of the femoral vein is not infrequent during convalescence. Other veins may suffer and occasionally there will be an arterial thrombosis or embolism.

Complications of the urinary tract include nephritis and cystitis; of the heart, pericarditis and endocarditis; of the nervous system, peripheral neuritis and meningitis. Otitis media is very common in children. Optic neuritis is a rare complication and may cause blindness. Skin complications include bed-sores, furunculosis, eczema, etc. Tonsillitis frequently occurs. In fact, the possibility of complications affecting nearly every portion of the body must be considered.

Diagnosis.—If the symptoms are carefully observed there should be but little difficulty in diagnosis. The prominent early symptoms are the characteristic fever, nose-bleed, headache, diarrhea, the eruption, abdominal tympany and tenderness and enlargement of the spleen.

Valuable information is obtained by *Widal's test*. This reaction is present in at least 95 per cent of typhoid fever cases

and very rarely in other conditions. In many cases the reaction may be obtained before the appearance of the eruption; it is almost always present at some stage of the disease. The test depends upon the power possessed by the blood serum of typhoid patients to cause clumping of typhoid bacilli.

It is made as follows: A drop of blood is obtained from the finger or ear of the patient and allowed to dry upon a glass slide or a piece of paper. A little of this blood is dissolved in sterile water and added to pure bouillon culture of the bacillus typhosus. A drop of this is placed upon a cover glass and inverted over a hollow-ground slide as a hanging drop. If this is examined with a high power microscope the motility of the bacilli will be seen to diminish and they will be clumped together within half an hour.

Another valuable test is the *diazo-reaction,* which is obtained with the urine of typhoid patients. This is usually found during the second and third weeks. It is not, however, diagnostic, since it often occurs in other febrile diseases, notably miliary tuberculosis, measles and meningitis. The following solutions are used:

1.	Sodium nitrite	0.5
	Distilled water	100.0
2.	Sulphanilic acid	5.0
	Hydrochloric acid, c. p.	50.5
	Distilled water	1000.0

One Cc. of the first solution and 50 Cc. of the second are mixed in a test-tube. An equal quantity of this mixture and urine are shaken together and a little ammonium hydrate (one-eighth of the volume of the mixture) is carefully added. The reaction is shown by the appearance of a red ring at the line of contact. In normal urine it is brown.

Positive information as to the character of the disease is obtained by the demonstration of the typhoid bacilli in the feces, urine and blood.

Remittent malarial fever is often confused with typhoid fever in the south. When the symptoms are obscure the demonstration of the malarial parasite and the absence of Widal's reaction is diagnostic. Malarial fevers are broken up by quinin; this is a therapeutic test.

Acute miliary tuberculosis lacks the characteristic temperature course; the cough is more prominent and there may be bloody expectoration; there is dyspnea and cyanosis; the pulse is rapid, abdominal symptoms are less prominent; ophthalmoscopic examination shows tubercles of the retina; there is leukocytosis; the rose-eruption and Widal's reaction are absent.

In *meningitis* the temperature is lower and more irregular; nervous symptoms are more prominent; the patient is restless, headache and delirium are more severe, there is photophobia, exaggerated reflexes and muscular rigidity; the pulse is irregular; the rash, abdominal symptoms and Widal's reaction are absent.

In *enteritis* abdominal symptoms are prominent but fever is slight and atypical; nosebleed is absent, the spleen is not enlarged, there is no cough, no eruption, slight nervous symptoms and absence of Widal's reaction.

Appendicitis, salpingitis, endocarditis, abscess of the liver, typhus and relapsing fevers are sometimes confused with typhoid.

PROGNOSIS.—The mortality of typhoid fever in different epidemics and different localities varies from 10 to 15 per cent. Since the introduction of the Brand treatment it has been greatly reduced. Under this treatment in the Philadelphia and Baltimore hospitals the death rate is slightly more than 7 per cent. The majority of the deaths are caused by hemorrhage or perforation. Very high temperature, low, muttering delirium and meteorism are unfavorable signs. Walking typhoid is peculiarly fatal. Old age, obesity, alcoholism, pregnancy and the puerperal state increase the likelihood of death.

TREATMENT.—*Prophylaxis.*—During the prevalence of typhoid fever the greatest care should be taken regarding liquids and food. Contamination of wells and water courses should be guarded against. All suspected water should be boiled, milk should be sterilized and all milk vessels scalded. Food should never be exposed where it will be accessible to flies. In armies, camps should be frequently changed, fecal matter should always be disinfected and covered and indiscriminate urination for-

bidden. Every patient suffering from typhoid fever should be isolated.

Disinfection of the typhoid excreta is of the greatest importance. Fecal matter should be passed into earthern vessels containing a solution of chlorinated lime, bichlorid of mercury or formalin. It should be thoroughly mixed with this, closely covered and allowed to stand at least two hours before putting into the water-closet. In the country the discharges should be disinfected with the same scrupulous care and then buried at some point remote from the water supply. The same care should be taken with the urine. After defecation the anal region should be wiped with moist bichlorid or carbolated gauze. This should be burned, as should all cloths soiled by vomitus, sputa or other discharges. The bed clothing and the linen worn by the patient should be changed daily, immersed in carbolic acid or bichlorid solution and thoroughly boiled. The sick-room should be well aired at least once a day and the floor, which should be uncovered, wiped up with an antiseptic solution. The attendant should wash his or her hands in an antiseptic solution after contact with any portion of the body where they might come in contact with discharges. Thermometers, drinking vessels, etc., should be sterilized. After death the body should be wrapped in an antiseptic sheet and a cotton plug inserted into the rectum to prevent leakage. The room vacated by the sick person should be disinfected by sulphur or formaldehyde, the floor, walls and furniture washed with antiseptics and the mattress sterilized, if possible, with hot steam and at least exposed to the rays of the sun.

The value of antityphoid vaccine as a preventative of typhoid fever has now been pretty well demonstrated by Professor Wright of the British army medical school at Netley. Many soldiers sent to the war in South Africa were inoculated. Not only was the incidence of typhoid fever in those inoculated greatly decreased but the mortality of those who contracted the disease was likewise greatly diminished. This is also shown by the following statistics of soldiers inoculated in the British army in India reported by Wright in a recent number of the British Medical Journal:

TYPHOID AMONG INOCULATED AND UNINOCULATED.

Period of observation	About 9 months
Total number of men under observation	11,295
Number inoculated	2,835
Number not inoculated	8,460
Number of cases of typhoid among inoculated	27 or 0.95 per cent
Number of cases of typhoid among uninoculated	213 or 2.5 per cent
Number of deaths from typhoid among inoculated	5 or 0.2 per cent
Number of deaths from typhoid among uninoculated	23 or 0.34 per cent

Hygienic and Dietetic.—Whenever possible the patient should be put in charge of a competent trained nurse. Constant and unremitting care are of the utmost importance. The room should be airy, well-ventilated, devoid of unnecessary furniture and without carpets and rugs. A good mattress and springs are necessities. The bed clothing should include only articles which can be washed. "Comforts" and quilts should never be permitted. All linen coming in contact with the person should be frequently changed and personal cleanliness secured by frequent bathing. The back, buttocks and sacral region should receive special care on account of the tendency to bed-sores. Alcohol and water, alcoholic or watery solutions of alum or salt, spirit of camphor and distilled extract of witch-hazel are useful for this purpose. After drying, a dusting powder may be applied to parts showing signs of irritation. The mattress should be covered with a rubber sheet.

The mouth should be kept clean with an agreeable wash, as listerine, glyco-thymoline, borolyptol or a mixture containing boric acid, tincture of myrrh, etc. The teeth should be frequently cleaned.

The nurse should keep a careful record of the temperature, pulse, fecal movements, urination and other symptoms. These should be recorded on a suitable chart.

Milk has for many years been considered the best article of diet in typhoid fever. It is usually given in small quantities (4 to 8 ounces) every two or three hours, the total daily quantity averaging about three pints. Unless the milk supply is

known to be reliable it should be sterilized; milk should not however be boiled unless necessary. Since it is often distasteful and actually disagrees with some individuals it is often necessary to modify it; dilution with lime-water, barley-water or Apollinaris makes it more agreeable and less likely to form curds.

Speidel suggests (N. Y. Med. Jour.) that it can be made more agreeable by placing it in a bottle with an equal quantity of sterile water and aerating by shaking. By adding a teaspoonful of white of egg, a pinch of salt and a teaspoonful of sugar it will make an appetizing "milk shake," which can be improved by adding one of the fruit juices, or clam broth if preferred. He also recommends the following peptonized ice-cream made by taking a measureful of peptogenic milk powder, adding to half a pint of milk a pint of water and four tablespoonfuls of cream, and heating to a boiling point, according to directions accompanying the peptogenic milk powder. The mixture is transferred to an ice-cream freezer and frozen. Peptonized milk should be given if the stools show that the food is not properly digested. Buttermilk or koumiss may be used as a substitute for milk. Malted milk and similar preparations are also useful foods. Albumin water is a pleasant food. It is made by adding the whites of two eggs to a pint of water and flavoring with lemon juice or whisky or brandy if stimulants are required. There are a number of excellent proprietary foods upon the market which are useful when milk cannot be taken or as an addition to the milk diet. These include liquid peptonoids, panopepton, Mosquera beef meal, somatose and the various beef juices. The tendency at present is to give the typhoid fever patient more of a variety in diet; some clinicians, in fact, no longer confine them to liquids. Shattuck of Boston gives semi-solids in suitable cases. His soft food diet includes soft-boiled or raw eggs, finely minced meat, the soft parts of raw oysters, soft puddings, soft toast without crust, wine jelly, bread without crust and milk, or crackers and milk. With this diet he has found during five years of experience no special tendency to any of the complications that might supposedly be looked for from a mixed non-liquid diet. On the contrary, the general condition of the patients has been better and complications even

less frequent. Bushuyev of Russia even gives solid foods, including eggs, porridge, cutlet, chicken, beef, bread, etc. While the milk diet should in the great majority of cases be the main dependence, still the judicious use of soups and broths, custards, junket, soft milk toasts, soft boiled eggs, cocoa, ice-cream, tea, coffee, etc., would seem to be rational in most cases. Abbott (Northwestern Lancet) suggests that the intervals between feeding be lengthened to three or four hours.

During convalescence the change to solid food should be very slow. Stengel makes it a rule to give no solid food until the temperature has been normal a week. Soft eggs are first allowed, then milk toast, next rice, then the patient is allowed to chew but not to swallow a little tender steak, next an oyster or two is allowed and the bill of fare further tentatively enlarged.

Hydrotherapy.—The patient should be allowed all the water he desires to drink; it is only necessary to see that it is pure. Where there is a possibility of contamination it should be boiled and then cooled in a refrigerator. Speidel suggests that it may be re-aerated by filling bottles half full and shaking them violently. Where more agreeable to the patient the water may be acidulated with lemon or lime juice. Water taken internally increases elimination from the kidneys, quiets delirium and promotes sleep. A recent writer says that the guide to the quantity of water required is the tongue. When it is dry increase the quantity until it becomes moist.

In mild cases of typhoid fever the temperature may be reduced and other symptoms improved by sponging or the cold pack. The most brilliant results in the treatment of typhoid fever are obtained by the *Brand method* of using cold baths. These are not given primarily for the reduction of temperature, though this is effected and adds to the patient's comfort. The shock produced by the application of cold to the skin produces temporary vascular spasm followed by a reaction which is associated with greater strength of the heart and a higher blood pressure. As a consequence of this, secretion and excretion are stimulated; the urinary flow is increased and more of the toxins are eliminated; there is increased force and slower rate of respiration; the function of the skin becomes natural; appetite

and digestion improve; the movements of the bowels are more regular and nervous symptoms are diminished. The improvement, in other words, is due to the increased elimination of toxins produced by the raising of blood pressure. The Brand bath is given whenever the rectal temperature exceeds 102.2° F. (39° C.). A tub containing water enough to cover the patient's body is brought to the side of the bed and the patient lifted or assisted into it. The temperature of the water is usually 70° F., though if the patient is very sensitive to the cold it may at first be 85° or 90° F. and then gradually cooled until he is accustomed to a lower temperature. An iced compress is kept upon the head during the bath. While the patient is in the water he is vigorously rubbed by the attendants in order to stimulate reaction and bring a healthy glow to the skin. After fifteen minutes (less if the discomfort is very great) the patient is taken out of the bath, put back upon the bed, dried with friction and wrapped in a blanket with hot-water bottles at the feet. If the reaction is slow a little whisky or hot beef tea may be administered.

In cases where the temperature drops decidedly and recurs quickly and there is much shivering and excitement Stengel gives small doses of codein ($^1/_{12}$ grain) for its quieting effect upon the nervous system, with excellent results. As already indicated, in nervous and anemic individuals and children the temperature of the water should be higher (85° to 90° F.). In some of these cases it is advisable to apply cold in some less formidable way. Hare believes (Therapeutic Gazette) children under puberty do not require and do not do well under this treatment. He thinks that better results are obtained by sponging with ice-water, or, better still, by rubbing the skin with pieces of ice while an assistant thoroughly rubs the skin.

Conditions which contraindicate the use of the cold bath are intestinal hemorrhage, peritonitis, severe lung complications, marked cardiac weakness and some complications like peripheral neuritis, abscesses, etc.

Medicinal Treatment.—The coal-tar antipyretics, acetanilid, phenacetin, antipyrin, etc., are dangerous drugs in typhoid fever. Not only do they further depress the heart which inclines to weakness but they also decrease the urinary output of toxins.

Their use may be justified in the face of extreme temperature when the bath treatment is impracticable, or as nervous sedatives. The doses should always be small (2 to 3 grains of acetanilid or 5 grains of phenacetin).

English employs the following formula, given every one or two hours for five or six doses:

Acetanilid .....gr. 3
Camphor, monobromated .....gr. ½
Caffein citrate .....gr. ½
One dose.

There is much difference of opinion as to the value of *intestinal antiseptics.* It is not probable that these drugs greatly cut short the course of the disease, since the typhoid bacilli are by no means confined to the alimentary tract, but by disinfecting and deodorizing the stools, checking diarrhea and preventing intestinal toxemia they probably modify the symptoms and, in some instances at least, prevent complications. It is good treatment at the beginning of an attack to give a preliminary dose of calomel. After this, constipation is usually best relieved by enemas. Many drugs are used as intestinal antiseptics. Salol being split up in the intestine into salicylic acid and phenol is one of the most valuable. The dose is 2 to 5 grains. The sulphocarbolates of sodium and zinc have many warm advocates. The dose of the former is 5 to 10 grains, of the latter 2 or 3 grains. The latter is to be preferred if there is diarrhea. Creosote, guaiacol, thymol, eucalyptol, iodin, carbolic acid, resorcin and beta- and benzo-naphthol are remedies of this class. For instance R. G. Woodworth (Denver Medical Times) claims to be able to abort typhoid fever with:

Guaiacol carbonate .....gr. 48
Salol .....gr. 48
Quinin salicylate .....gr. 24
Make 24 capsules. One every two hours and at night.

Pepper preferred a pill containing silver nitrate combined with small doses of extract of opium when there was diarrhea and with extract of nux vomica and sometimes belladonna when there was constipation. A pill containing acetate of lead, ½ grain, and extract of opium, ⅛ to 1/6 grain, is also a favorite in diarrhea.

J. M. Peck (Jour. Am. Med. Asso.) relies chiefly upon calomel

and chlorin. The first is given in $^1/_{10}$ to ½ grain doses every half hour, as conditions may demand, until six or eight doses are taken. As soon as the bowels move they should be washed out from below with a sterile salt solution. The course of calomel should be repeated every twenty-four to forty-eight hours and the enema as often as necessary, as determined by meteorism or diarrhea. Dr. Peck thinks chlorin a very powerful germ destroyer, but harmless to the animal economy. His favorite method of administering it is that of Yeo, but without quinin:

Potassium chlorate	gr. 30
Hydrochloric acid	m. 60
Distilled water	oz. 12

Put the potash in a dry bottle of sufficient size, add the acid, cork and allow to stand until chemical action is complete, then add the water a little at a time. A tablespoonful is given every two hours until the stools become less offensive, then at longer intervals.

Among other formulas which are used is the following tablet:

Bismuth betanaphthol	gr. 3
Guaiacol	gr. ¼
Thymol	gr. ⅛
Eucalyptol	gr. ¼

Royster recommends the following pill:

Thymol	dr. 1½
Guaiacol carbonate	dr. 1½
Soap, a sufficient quantity.	

Make 30 capsules. One every four hours.

The well-known and formerly much-lauded Woodbridge treatment belongs to the class of intestinal antiseptics. It is now discredited. The mortality of the cases treated by this method during the Spanish-American war was no lower, in fact higher, than that of others. Woodbridge gives very small doses of podophyllin, calomel, guaiacol carbonate, menthol, thymol, and eucalyptol at very short intervals. A modification of the Woodbridge treatment used by Mulheron consists of the use of the following capsule:

Calomel	gr. 10
Thymol	dr. 1
Eucalyptol	dr. 1
Salol	dr. 1
Guaiacol carbonate	dr. 2

Make 20 capsules. One every three hours.

Turpentine is acknowledged to be the best remedy when there is decided tympanites, dry tongue, delirium and marked prostration. Three to five grains of white turpentine may be prescribed in pill form or spirit of turpentine may be given, 10 to 20 drop doses, as in the following emulsion:

Oil turpentine	oz.	½
Oil wintergreen	dr.	½
Powdered acacia	dr.	4
Glycerin	oz.	1
Cinnamon water, enough to make	oz.	8

Tablespoonful every two or three hours.

Turpentine is also used locally in the form of stupes to the abdomen in case of tympanites and adds to the patient's comfort; or it may be added to the enema with benefit. Sometimes it is necessary to introduce the long rectal tube in order to facilitate the escape of gases from the colon.

Stimulants are required at some stage in most cases of typhoid fever, but their early use without special indications or their routine administration is to be deplored. Stengel (Penn. Med. Jour.) states the case plainly as follows: "Excepting in the very weak, in the aged, and in those who have been accustomed to regular drinking, alcohol should not be used until the first heart sound shows evidence of weakness, the pulse grows feeble, or the nervous symptoms indicate a loss of systemic tone. When these indications are present, alcohol should always be given at once, but its administration should be cautious and sparing. Two to four drams of brandy or whisky or a corresponding amount of wine every two or three hours is sufficient for cases of moderate severity, and sometimes a smaller quantity is sufficient. In emergencies larger amounts may be required, and sometimes as much as an ounce must be given every hour for several hours in succession."

According to Musser (Therapeutic Gazette) the states calling for alcoholic stimulation are (1) toxemia, (2) exhaustion, and (3) the accidents—perforation and hemorrhage. Strychnin in moderate doses ($^1/_{60}$ to $^1/_{30}$ grain) is also recommended. It may be given in association with the alcoholic stimulant. In cases of emergency camphorated oil, a syringeful, by hypodermic injection, gives quick stimulation.

If there is persistent *vomiting* the food should consist of milk

and lime water in small quantities, or liquid peptonoids. Iced champagne may be given in small doses. Dreshfeld uses the following internally:

Bismuth subnitrate .....gr. 10
Cocain hydrochlorate .....gr. ¼

A powder of this size is given three or four times daily.

A sinapism may be placed upon the pit of the stomach. If vomiting develops early, small, repeated doses of calomel are useful.

Intestinal hemorrhages require perfect rest, the application of ice or cold compresses to the abdomen, heat to the extremities and hypodermics of morphin to immobilize the bowels. Turpentine internally or ergotin hypodermically may prove of value. Hare gives Monsell's salt in 3 grain pills every half hour. The lead and opium pill is one of the most valuable remedies. If there is much loss of blood normal salt solution is injected into the bowel or subcutaneously.

Delirium is usually relieved by the hydrotherapeutic measures. When the circulation is feeble the best results are obtained by free stimulation with alcohol. Musk and ether are useful in the nervous type. The bromids, chloral, etc., may be required.

In case of *perforation* the only hope of the patient lies in surgical intervention. It is now apparent that many of these cases may be saved if this is prompt.

ULCERS, CUTANEOUS.

ETIOLOGY.—Cutaneous ulcers are most frequently found on the lower extremities and in the majority of cases are due to the local congestion produced by varicose veins or to feebleness of the circulation from some other cause. A bed-sore is really an ulcer produced by pressure and blood stasis. Not infrequently there is an eczematous condition of the skin. Syphilis is sometimes the cause of persistent ulceration. Corsiglia says (N. Y. Med. Jour.) that an ulcer situated above the middle of the leg is syphilitic. The ulcer may be inflamed, tender and irritable, but in the majority of cases, if it has existed for some time, it is indolent or callous, infiltrated with inflammatory exudate, its edges hard, elevated, rounded and

insensitive and its surface a grayish-red and covered with a thin, dirty discharge. The surrounding skin is congested, and if there is a varicose condition of the veins these are prominent.

TREATMENT.—The treatment of these indolent sores is often unsatisfactory. It is important that the patient shall rest in bed or upon his back with the limb elevated—but in the majority of cases the patient is unwilling or unable to assent to this and it is necessary to treat him while he follows his usual occupation. The indications for treatment are (1) to relieve the congestion; (2) to remove or promote the absorption of the exudate and (3) to keep the ulcer in an aseptic condition, most favorable for healing. The method of Unna or some modification of it is usually employed. The leg is first thoroughly washed with soap and water, carefully dried and rubbed with alcohol; or if the ulcer is a very indolent one and covered with old granulations, it may be better to shampoo it thoroughly with a little piece of green soap, rubbed in with soft flannel. After washing, the surface is rinsed with clean water and carefully dried. This process stimulates the circulation and reduces the inflammatory thickening. Hebra then applies diachylon ointment on strips of lint and bandages the leg from toe to knee with a roller bandage. This, if repeated daily and done carefully, is followed by marked improvement.

A popular method of treatment consists in the application of Unna's dressing. The leg is first washed with soap and water, as already directed. This dressing contains the following:

Zinc oxid	Gm. 20
Gelatin	Gm. 20
Glycerin	Cc. 80
Water	Cc. 80

This is made fluid by heat and is kept warm in a water bath while it is painted on from the middle of the foot to just below the knee. While still warm the bandage should be applied. This should be of firm but coarse material, with open meshes, and two to two and a half inches wide. It should be applied very smoothly without wrinkles or reverses, and hence must be put on in short pieces (Michel, Chicago Clinic). After the limb is covered apply another coat of the zinc-gelatin and then another layer of bandage, and so on until the bandage is three

to five layers in thickness. This dressing may be left in place for several weeks. If the ulcer discharges, a window may be cut in the bandage, local applications of iodoform, europhen, etc., made and a gauze and cotton dressing and a bandage applied over it.

Couper (Glasgow Med. Jour.) uses a similar method. He first dusts the ulcers with iodoform, then applies:

Gelatin	Gm. 15
Zinc oxid	Gm. 10
Adipis, recent	Gm. 10
Glycerin	Gm. 65
Ichthyol or salicylic acid	Gm. 2

A layer of cotton is applied over this and the whole held in place with a roller bandage. This is to be reapplied every two or three days at first, then once a week.

The gelatin dressings as they dry contract and make uniform pressure on the blood-vessels, thereby reducing the congestion and edema.

A modification of this method recommended by Baaz (Sammlung Klin. Vorträge) consists of washing the sore with bichlorid solution (1:1200) after the preliminary cleansing with green soap and water. The part is then dried, iodoform dusted on, a piece of oil silk placed over the sore so as just to cover the edge, the surrounding parts covered with Lassar's paste on lint and the whole covered with sterile gauze and cotton. The zinc-gelatin mixture of Unna is now applied with the bandage as already described. This dressing is renewed every three weeks or more frequently if the discharge is very great.

Cipriani (Ther. Monatshefte) after washing with hot water and drying, dusts iodoform on the ulcer and then bandages the leg from ankle to knee with strips of bandage wrung out of a 1 to 2 per cent formaldehyde solution. Four or five layers are applied, then a layer saturated with a 2 to 4 per cent solution of the same drug.

Simple strapping of the ulcer is often useful. Van Schaick gives the following directions: "Strips of plaster, about an inch wide, are applied around the leg, covering the ulcerated surface, which must be protected by means of a sheet of absorbent gauze. The whole leg must, however, be well bandaged from the toes to the knees, or else the constriction caused

by the strapping will not only produce much discomfort but may also be a source of danger by greatly diminishing the return circulation."

Lucy B. Fisher (Trained Nurse) gives the following directions, which in her hands have given excellent results:

"1. Use aseptic methods with same care you would on an aseptic wound.

"2. Spray with peroxid of hydrogen thoroughly

"3. Make ulcers perfectly dry with absorbent cotton.

"4. Powder with acetanilid, one part, mixed with four of boracic acid powder.

"5. Use strips of dry antiseptic gauze, an inch wide and a yard long, over each ulcer. Lay them on loosely, so as to be effective absorbent.

"6. Place antiseptic cotton on top of gauze.

"7. Bandage from toes to knee with firm cotton bandage.

"8. bandage with starch bandage when patient shows an inclination to tamper with the dressing.

"When the ulcer is deep, cut a disc of pasteboard large enough to extend half an inch beyond the edge of the ulcer, and cut a hole about the size of the ulcer (a little smaller) in the center of the disc. Bandage this on over the ulcer. In a day or two after using this disc the ulcer will be completely filled with granulations. If the ulcer has granulated above the surface, bandage a complete disc of pasteboard over the ulcer. It is a simpler way of reducing granulations than by the use of lunar caustic.

"Powdered charcoal should be use on ulcers that are gangrenous before using the acetanilid mixture."

G. V. Buehler (Phila. Med. Jour.) recommends the following home remedy for leg-ulcers: "A pint of boiled linseed-oil is heated thoroughly and in it is put a half-pound of the red oxid of lead and the mixture allowed to boil thoroughly, and after cooling it is again boiled, and on cooling a second time, a half ounce of gum camphor is stirred in. The oxid of lead, as I understand, is decomposed into a black oxid and the repeated boiling changes the consistency so that it can be made into a stick much after the fashion of diachylon plaster and can be spread on a cloth by heating over an alcohol flame."

Another ointment recommended is:

Carbolic acid	dr. ½
Boric acid	dr. 2½
Camphor	dr. 2
Ichthyol	dr. 5
Sweet almond oil	dr. 2½
Pineoline	oz. 2

Apply night and morning.

URETHRITIS—See Gonorrhea.

URTICARIA; HIVES; NETTLE-RASH.

DEFINITION.—An inflammatory affection characterized by the formation of pale-red elevations of the skin of variable shape, attended by decided itching and stinging and temporary in duration.

ETIOLOGY AND PATHOLOGY.—Urticaria is a vaso-motor disorder and is reflex in its origin. The most frequent cause is some gastro-intestinal derangement. It may be the result of auto-toxemia from indigestible, fermenting or decomposing substances in the alimentary tract. Some individuals have an idiosyncrasy for certain articles of food which they cannot eat without being in danger of an attack of "hives;" among the most common of these are strawberries, shell-fish, pork, sausage, mutton, cheese, oatmeal, nuts and mushrooms. It may also be produced by intestinal parasites; by drugs, including copaiba, cubebs, turpentine, quinin and morphin; it may be reflex from a diseased uterus or ovaries or an elongated and adherent prepuce; it may follow the bite of insects, as the mosquito, wasp, bee or bed-bug, or be due to the direct action of any other irritant to the skin, including cold, heat, poisonous plants or chemicals.

The morbid change consists of vaso-motor spasm, followed by paresis with an outpouring of serous exudate into the tissues.

SYMPTOMS.—The eruption appears suddenly, usually consisting of papular or linear lesions (wheals) although they are very variable in form. The wheals are pale or pink at their summits and reddened at their peripheries. There is intense itching, tingling or smarting, which impels the patient to scratch; this,

or any other irritation of the skin, causes the evolution of more wheals and extends the area of the eruption. In some cases running the finger-nail or a pencil along the cutaneous surface will bring up a reddened line; in this way figures or letters may be drawn upon the skin (dermographism). Urticarial eruptions may also appear upon the mucous surfaces; in the throat they may cause suffocative attacks.

Special names are given to different types of the disease. *Urticaria papulosa* is more frequent in children. The eruption is papular, itching is intense and the summits are therefore likely to be found torn and excoriated. In *urticaria tuberosa* the lesions are very large—sometimes egg-sized. *Urticaria hemorrhagica* is characterized by hemorrhage into the wheals. If the upper layer or the wheal is changed to a vesicle the condition is known as *urticaria bullosa*. In *urticaria edematosa* (angioneurotic edema) large edematous swellings are produced.

PROGNOSIS.—Usually the eruption disappears within a few hours or days. If the irritation is repeated it is likely to recur. The condition is sometimes chronic; in such cases a cure depends upon removal of the cause.

TREATMENT.—In the majority of cases the first indication is to empty the digestive tract. If the attack comes on soon after eating an emetic should be administered. Epsom or Rochelle salts, Hunyadi water or citrate of magnesia will sweep any decomposing material out of the bowels. In cases showing a tendency to linger small repeated doses of calomel may be advisable. Bismuth subnitrate is a good alimentary sedative; it may be combined with sodium sulphocarbolate (5 to 10 grains), salol (2 to 5 grains), benzo-naphthol (5 grains), or other intestinal antiseptic, if auto-intoxication is suspected. The diet should of course be carefully watched. Pastries, sweets, pork, shell-fish, berries, etc., should be forbidden. An exclusive milk diet is advisable during or directly following severe attacks. The clothing should be soft and non-irritant; flannel is not well borne.

Search should be made for the cause. This is especially important in chronic cases. The digestive and sexual organs should be subjected to careful inquiry and the rheumatic or gouty diathesis treated appropriately. Lusk says (Post-Gradu-

ate) that in many cases of chronic papular eczema in boys there is phimosis.

In obscure cases sodium salicylate, the alkalies, quinin, ergot, arsenic, potassium iodid, potassium bromid, valerian, antipyrin, pilocarpin, atropin and ichthyol are used. Hughes recommends:

Powd. pilocarpin .....gr. 1½
Ext. guaiac .....gr. 1½
Lithium benzoate .....gr. 3

Two to four to be taken every twenty-four hours.

Or the following may be tried:

Quinin sulphate .....gr. 16
Ergotin (Bonjean) .....gr. 12
Ext. belladonna .....gr. ½.

Make 16 pills. One every two hours.

Local applications are necessary to relieve the itching. Weak carbolic acid lotions (dram to the pint of water), liquor carbonis detergens (dram to 8 ounces of water), alkaline lotions or baths, thymol (¼ to 1 dram to the pint of alcohol and water), menthol (5 to 10 grains to the ounce in ointment or alcoholic solution), vinegar or cologne in water and other antipruritic drugs may be tried. Dusting powder of zinc oxid, starch and talcum powder may follow the lotions. The following are useful formulas:

Carbolic acid .....dr. 1—2
Sodium borate .....dr. 4
Glycerin .....dr. 2
Alcohol .....oz. 2
Water, enough to make.....oz. 16

Or—

Chloral hydrate .....Gm. 5
Boric acid .....Gm. 30
Distilled water .....Cc. 180

Use as a lotion.—Quinquaud.

Or—

Chloral .....dr. 1
Camphor .....dr. 1
Powd. starch .....oz. 1—2

Keep tightly corked. Rub in with the hand.—Bulkley.

VACCINIA; VACCINATION; "COW-POX."

DEFINITION.—An acute disease acquired by inoculation with the virus of cow-pox. It is supposed to be an attenuated form of small-pox which has lost its virulence by passage through several generations of animals.

ETIOLOGY.—The disease is only transmitted by vaccination—that is, by inoculating the patient with fresh virus obtained either from the vesicle of a calf suffering from the disease or from another individual who has recently been vaccinated. At present only bovine lymph is used. This may be applied to ivory points, allowed to dry and kept in a clean receptacle until ready for use or it may be mixed with glycerin in order to inhibit the growth of bacteria and dispensed in hermetically sealed capillary tubes. The glycerinated virus is now used by most clinicians in preference to the points. The advantages claimed for it are that it will keep longer, the glycerin acting as a preservative; that it is more nearly aseptic and, on account of its being sealed in glass, is less likely to bacterial contamination; that it therefore produces fewer bad arms; and that it gives a larger percentage of successful vaccinations. These contentions are in the main supported by the evidence of statistics. The health department of New York, in 1898, reported about 21,000 vaccinations with glycerinated lymph; more than 98 per cent of these were successful. During 1900 the state board of health of Maine made a collective investigation. Eighteen thousand, nine hundred and twenty-five cases were reported, 16,320 with glycerinated lymph, 2,605 with dried lymph. In primary cases the first was successful in 90 per cent of the cases, the latter in only 66.4 per cent. Contrary to expectation, however, it was found that the percentage of bad arms was larger with the glycerinated than with the dry product. Most of the bad arms occurred in Lewiston and Auburn; if these cities are excluded the advantage in every way is decidedly with glycerinated lymph.

TECHNIQUE OF VACCINATION.—The following method of procedure will be found generally satisfactory: The arm of every patient is washed with soap and water and carefully dried. If there is any suspicion of contact with suppurative bacteria a

solution of corrosive sublimate or carbolic acid may be applied, but if used at all it should be carefully removed with sterile water, as even a little of the antiseptic remaining on the skin may destroy the activity of the vaccine. The vaccinator's hands should be, of course, scrupulously clean. The best instrument with which to scarify the site of vaccination is an ordinary cambric needle. This may be made aseptic by boiling or by passing it through the flame of an alcohol lamp or gas jet. It *should not* be dipped into carbolic acid or other antiseptic. It is advisable to have a clean needle for every patient.

In using glycerinated lymph the opening in the skin should be small; a denuded spot as large as a pea is ample, since the degree of protection afforded is not dependent upon the size of the scar. It is important that the vaccine should be rubbed in carefully and thoroughly; this may be done with the side or the eye-end of the needle. It is best to supplement this by pricking it in with the point to insure the entrance of the vaccine to the deeper layers of the skin. Glycerinated lymph dries slowly and the wound should therefore be protected until absorption is assured. When it is desired to save time or resume the clothing at once a vaccine shield is applied. In case of necessity one may be improvised from a pill-box or a large bunion plaster. When the surface is dry an aseptic (not antiseptic) gauze dressing may be applied. The scab when it forms is the best protection against infection. It should not therefore be removed unless there is an accumulation of pus beneath it. The usual site of vaccination is on the left arm over the deltoid muscle. When a scar in this location is objectionable the virus may be introduced into the outer aspect of the thigh.

Symptoms.—Two or three days after vaccination a reddened papule makes its appearance. This gradually increases in area, becomes paler in the center, raised at the edges with an inflamed areola and about the fifth day it is transformed into a vesicle. This is completed the eighth day when it is found to be umbilicated and distended with fluid. Its contents now become turbid, the inflammatory base surrounding it widens, the lesion is swollen and intensely tender and itching is intolerable. In severe cases the whole arm may be swollen and the axillary glands much enlarged. About the twelfth day the vesicle dries

down into a scab which is not detached for another week or longer, leaving a permanent scar.

During the development of the vesicle there is malaise, anorexia, possibly nausea and vomiting, headache and some elevation of temperature.

COMPLICATIONS.—A mixed infection may result when there is carelessness in vaccination or the arm is not properly cared for afterward. The badly swollen arms are undoubtedly due to the introduction of suppurative germs into the wound. Erysipelas and destructive sloughing or gangrenous sores are rare complications arising in this manner. Syphilis was occasionally transmitted when humanized virus was used; with bovine virus this is hardly possible. Tetanus is of very rare occurrence. It has also been repeatedly asserted by anti-vaccination agitators that tuberculosis, cancer and leprosy are spread by vaccination. There is absolutely no warrant for these assertions and they are not supported by the slightest evidence. A rare complication is a generalized eruption of vaccinia pustules.

REVACCINATION.—While the immunity conferred against small-pox is usually complete for some time after vaccination, it is somewhat diminished after a number of years. Occasional vaccination is therefore advised. According to the German law, children must be vaccinated during the first year, again at ten and a third time at puberty. This is a good rule. It is always safer to revaccinate every one upon exposure to small-pox or in the presence of an epidemic.

VAGINITIS AND VULVITIS.

DEFINITION.—Inflammation of the vagina and vulva.

ETIOLOGY.—Vaginitis and vulvitis may be caused by uncleanliness, the discharges from cancerous or ulcerating sores or vesical or rectal fistulæ, and by intestinal parasites which have migrated to the genitals; but in the majority of cases inflammation of these parts is due to gonorrhea. Vulvo-vaginitis is not uncommon in children who have been accidentally or criminally infected. Vaginitis is most common in young women, especially if they were previously debilitated.

PATHOLOGY.—There is hyperemia, redness and swelling of the mucous membrane with a profuse purulent discharge. The

labia may become edematous. If the process penetrates to the glands these may become greatly swollen and suppurate; the vulvo-vaginal glands, situated on either side of the vaginal orifice at the inner aspect of the labia majora, are especially susceptible to infection, sometimes forming suppurating tumors or cysts of considerable size. Acute inflammation of the vagina proper is not very common and is usually secondary to vulvitis or endocervicitis. In acute gonorrhea the part most likely to be inflamed is the mucous membrane of the vaginal portion of the cervix. There is also likely to be some inflammation of the urethra. In subacute and chronic inflammation of the vaginal and cervical mucous membrane granulations often form.

Symptoms.—Aside from the abundant purulent discharge which bathes the vulva, oozes from the vagina and often finds its way to the surrounding skin of the labia, perineum and inner aspect of the thighs causing burning and itching, there is swelling and tenderness of the parts and (in gonorrhea) painful urination due to the associated urethritis. There is also likely to be a sense of fulness and discomfort in the pelvis, increased by walking, defecation and other movements. The sexual appetite is sometimes increased. There is a decided tendency for gonorrhea to become chronic and to spread to the upper genital tract—the uterus and Fallopian tubes.

Diagnosis.—An inflammation of the vulva or vagina is readily detected by inspection of the parts. Since it is important to determine whether or not gonorrhea is present microscopic examination of the discharge to determine the presence or absence of the gonococcus should never be omitted.

Prognosis.—Favorable as regards life but the danger of chronic gonorrhea invests the disease with the greatest personal and sociologic importance. Not only may it be the cause of life long suffering but it tends to produce sterility and undermines the health of mother and offspring. It is also a latent means of communication for the spread of the disease. The vaginal discharge is very contagious and if introduced into the eye of the newly-born child will cause ophthalmia neonatorum, often ending in permanent loss of sight.

Treatment.—In non-gonorrheal cases the first essential is removal of the cause. Cases due to cancer or fistula demand

surgical intervention. Worms should be removed by injections of salt-water or infusion of quassia. Cleanliness is of the utmost importance. The cure may be completed by irrigation with hot boric acid, creolin, or weak boric acid solutions. These may be followed by a mild astringent, as the following:

Tannic acid .....dr. ½
Boroglycerin .....dr. 3

Make 6 suppositories. Use night and morning after hot douche.

The indications for treatment in gonorrheal cases are the removal of the discharge and the destruction of the gonococci. The vulva should be bathed and the vagina irrigated twice a day with a solution of bichlorid of mercury (1 to 5000) or permanganate of potassium (1 to 5000), using an ordinary fountain syringe. The procedure is more effective if the solution is used hot; at least a gallon of the irrigant should be used. If the cervix is affected, as is likely to be the case, this should also be irrigated with a return-flow tube as far as the internal os or carefully wiped dry with absorbent cotton on an applicator. If the urethra is affected this should also be irrigated in the same way. Protargol (½ to 3 per cent solution) is also a useful application to the cervical canal and urethra; it may also be instilled into the uterine cavity when this is affected.

Ravogli (Med. News) praises ichthyol. He says: "Ichthyol has a beneficial action, especially in cases of acute gonorrhea in the female, and in my clinics every case of acute vaginitis and vulvitis easily yields to a few applications of tampons dipped in a preparation of ichthyol and glycerin, equal parts." This remedy may also be combined with others, as iodoform and tannic acid (when a decided astringent effect is desired) and used in the form of suppositories:

Ichthyol .....dr. 1
Iodoform .....dr. 1
Tannic acid .....gr. 30
Lanolin .....dr. 1
Cacao butter, a sufficient quantity.

Make 6 suppositories. To be used twice daily after a hot douche.

Eichhorst smears the following ointment upon a tampon and introduces it after irrigating the vagina:

Alum	dr. 2½
Iodoform	dr. 2½
Lanolin	oz. 1½
Lard	oz. 1½

In the subacute and chronic cases the silver salts are the most valuable remedies. Nitrate of silver is usually employed in solutions varying in strength from 10 to 60 grains to the ounce of distilled water, the strength used depending upon the chronicity of the condition. The vagina is first thoroughly douched or it may be scrubbed with soap and water. If it is desired to reach the entire vaginal mucosa a glass speculum is introduced and the surface swabbed with the solution while it is slowly withdrawn. Protargol is also a useful drug in the chronic cases.

VARICELLA, "CHICKEN-POX."

DEFINITION.—An acute contagious disease, usually occurring in children and characterized by an eruption of vesicles which come out in crops.

ETIOLOGY.—Chicken-pox is probably due to infection with a specific microorganism as yet unknown. It is very common in children during the spring and autumn. Epidemics of the disease are frequent. It is in no way connected with small-pox.

SYMPTOMS.—The period of incubation is ten to fourteen days. The disease usually begins quite suddenly with slight feverishness, loss of appetite and malaise followed by the characteristic eruption within twenty-four hours. Quite frequently the rash is the first thing to attract attention. At first this consists of a number of papules or pimples; in a few hours these change to vesicles which, in the course of two or three days, dry down into crusts which are thrown off in a week or more. In some cases these vesicles become pustular but seldom have the inflamed roseola or the umbilicated center of the variolous pustule. A characteristic feature of the eruption is the appearance of the lesions in "crops" every two or three days, so that papules, vesicles and crusts may be seen upon the skin at the same time. Scars are seldom left, unless the child picks off the scabs. The eruption usually makes its appearance upon the face but there are seldom many vesicles in this locality; they are most frequent upon the trunk. The duration of the disease is about a

week. Gangrenous and hemorrhagic forms have been described.

DIAGNOSIS.—There is no difficulty in diagnosis in the majority of cases. Much difficulty, however, has attended the present mild epidemic of small-pox. The differential diagnosis is discussed under that disease (see Variola). Where the diagnosis is difficult to make it may be wise to follow the injunction of Eichhorst, who says: "Chicken-pox is so pronounced an infectious disease of childhood that practically it is well to not diagnose the disease at all in adults, but to consider suspected chicken-pox in the latter as mild small-pox."

PROGNOSIS.—Chicken-pox is never fatal.

TREATMENT.—These patients require little treatment. They should be kept at home and not allowed to associate with other children until the scales have disappeared from the skin. During the febrile period of the disease they should be put to bed and placed on a light liquid diet. If there is considerable elevation of temperature a febrifuge mixture containing aconite and sweet spirits of niter may be administered. Most comfort is given by tepid baths or sponging with warm water. If there is much itching a carbolized lotion or ointment will give relief. Scratching should be forbidden; young children may be compelled to wear mittens.

VARIOLA.

DEFINITION.—An acute contagious disease characterized by a typical pustular eruption and marked constitutional disturbance.

ETIOLOGY.—Small-pox occurs among all races; but the negro is peculiarly susceptible to the disease. No age is exempt and it may even be contracted by the fetus in utero. The sexes are equally liable to the contagion. Vaccination in the great majority of cases confers immunity.

Contagion is communicated chiefly by the pus and scales derived from the eruption but also through the air by way of the respiration and from contact with the various excretions of the body of the infected person. In many cases it is probably carried in the clothing. No specific germ has yet been discovered but it is probable that one exists which finds its way into the circulation.

PATHOLOGY.—The essential morbid process is found in the

skin. The lesion appears first as a papule caused by inflammation and infiltration of the papillary layer. The papule feels hard and "shot-like" to the finger and is freely movable under the skin. At its summit a serous effusion collects forming a vesicle. Meanwhile in the center of the nodule, beneath the vesicle, a process of coagulation necrosis is going on which causes a dimpling or umbilication of the vesicle. The vesicular fluid finally becomes cloudy from cellular infiltration, the necrotic process becomes more extensive, suppuration ensues and a pustule is formed. Inflammation usually commences in the rete mucosum; if it is confined to this portion of the skin no scarring results; but in most cases the corium is invaded by the suppurative process and a pock is formed. There may be degenerative changes in the heart, liver and kidneys. In very severe cases there are hemorrhages from the mucous surfaces.

SYMPTOMS.—The onset is usually sudden, the disease commencing with a severe chill, prolonged chilliness, or, in children, with convulsions. The temperature rapidly rises to 103° to 105° F. and the pulse becomes rapid, full and hard. Severe pains in the muscles and back and intense headache are the most prominent subjective symptoms at this stage. Nausea and vomiting are common. In a certain percentage of cases there are initial rashes resembling those of scarlatina and measles; these usually appear the second day and are most pronounced on the inner surface of the thighs, the abdomen, the lateral aspects of the thorax and the axillæ. In cases of the hemorrhagic type there may be petechiæ.

Upon the third or fourth day of the disease the fever subsides and the peculiar eruption makes its appearance. This consists at first of macules which rapidly change into hard, "shot-like" papules, attended by itching and burning of the skin. The eruption appears first upon the face and spreads rapidly over the rest of the body, the lower extremities being attacked last. In about three days more or on the sixth of the disease, the papules become vesicular, filling up with cloudy serum which increases in turbidity. The top of each vesicle is depressed in the center, giving it an umbilicated appearance. This is characteristic.

The vesicles become pustular about the ninth day of the

disease; they increase in size and the umbilication disappears, the lesion now consisting of a prominent, conical, pustular eminence, surrounded by a red and swollen base. If these pustules are separated by intervals of healthy skin the condition is called *discrete* small-pox; if they are situated closely together so that the inflamed areas coalesce it is called *confluent* small-pox. In the latter case the features become enormously swollen, the eyes often closed and the outlines of the face so distorted that the patient would hardly be recognized by his dearest friends. The itching and burning is intolerable. The eruption of small-pox is worst in nearly all cases upon the unprotected surfaces of the body, viz., the face, scalp, fingers and hands. An early symptom is a peculiar fetor of the body and breath.

Coincident with the appearance of the pustules and suppuration there is a secondary or septic fever. This is high, irregular and associated with more profound constitutional disturbance than occurs in the primary stage. There are likely to be chills, sweating, diarrhea, convulsions (in children), delirium, tremor and sometimes coma. The pulse is rapid, feeble and often irregular. The urine is often albuminous. Debility is profound. The temperature usually subsides in three or four days and disappears with the suppurative process.

The final process, in favorable cases, is the drying up of the pustules and the formation of scabs which come off about the fifteenth or sixteenth day of the disease. Scarring or "pocks" are left in most cases from the involvement of the corium. The eruption is not confined to the skin but may invade the mucous membranes of mouth, nose, throat and bronchi. Sore-throat is found in nearly all cases. Pustules are not formed in these localities but serious ulceration may follow.

Hemorrhagic or black small-pox is a very fatal form of the disease. Two varieties are described: In the first or *purpura variolosa* the eruption consists of a wide-spread purpuric rash, without the formation of pocks. There are also hemorrhages into the mucous surfaces. In the second form, *variola hemorrhagica pustulosa,* there are hemorrhages into the vesicles.

Varioloid is a mild form of the disease occurring in those who have been vaccinated or have had previous attacks of the disease. Pustulation rarely occurs and secondary fever is often absent.

COMPLICATIONS.—Laryngitis, bronchopneumonia, parotitis, erysipelas, neuritis, inflammation of the eyes (rarely causing blindness), otitis media, boils and ulcers of the skin, arthritis and very rarely nephritis are among the complications. These, however, are not common.

DIAGNOSIS.—The wide-spread epidemic of mild or "modified" small-pox through which we are now passing and which is often confused with chicken-pox calls for special care in diagnosis. The prominent points are brought out in the accompanying table. We may emphasize the following: (1) The high primary fever precedes the eruption; (2) remission of fever with its appearance; (3) umbilication of vesicles; (4) the secondary or septic fever; (5) the eruption is most pronounced on the hands and face and rarely appears in "crops." We should remember that in some cases, however, there are crops and that in mild cases which stop short of suppuration there is no secondary fever.

VARIOLA.	VARICELLA.
Initial high temperature; typical papules on third or fourth day.	Constitutional disturbance slight; eruption appears at nearly same time as fever.
Distinct remission.	No remission.
Eruption appears first on head and neck and travels downward.	Eruption appears first on neck and trunk and spreads irregularly.
Eruption rarely in crops on same surface.	Eruption usually comes out in crops.
Unprotected surfaces most violently attacked.	Eruption most marked upon back and lower extremities.
Vesicles of uniform size and umbilicated.	Vesicles of different sizes and rarely umbilicated.
Vesicles multilocular and do not collapse on puncture.	Vesicles unilocular, collapsing on puncture.
Secondary fever on appearance of pustules.	No secondary fever.

In *impetigo contagiosa* there is no initial fever, the eruption is superficial and begins not as papules but as vesiculo-pustules that enlarge by peripheral extension. The crusts are not adherent and crumble easily. Scars do not form.

The initial rashes seen in the early part of the disease may

cause confusion. In measles the severe pains of small-pox are absent and there are catarrhal symptoms. Scarlatina presents a more uniform and diffuse eruption. If there is any question the diagnosis should be withheld for a few days.

Purpuric variola may be mistaken for purpura hemorrhagica. In some cases the diagnosis seems impossible until the case is far advanced or others develop. G. D. Haggard (Northwestern Lancet) says that in these cases "the severity of the symptoms; the continued nausea and vomiting; the agonizing pain in the back; the elevation of the skin in mass or as a pebbly surface; a confluent eruption from the first though slow to appear; the more sparse appearance on Simon's triangle, together with the known exposure, will make the diagnosis more certain. In this form the odor should be noted."

Relapsing fever and cerebrospinal meningitis sometimes causes difficulty.

PROGNOSIS.—The mortality varies greatly in different epidemics. In the mild form now present in the country the death rate is almost nil. In some epidemics it ranges from 25 to 30 per cent. The confluent form is much more dangerous than the discrete. The hemorrhagic form of the disease is almost inevitably fatal. Negroes are more susceptible to its ravages than whites. Occurring in pregnancy the woman usually aborts but does not necessarily succumb herself, as formerly thought; in fact, in most cases she recovers.

TREATMENT.—*Prophylaxis.*—The value and reliability of vaccination as a prophylactic for smallpox has been proven to the satisfaction of all intelligent and reasonable individuals. For the method of performing it see Vaccinia. But in the presence of the disease not only should there be wholesale vaccination of every individual liable to attack, but a proper quarantine should be enforced. In a city the patient should be taken to a properly equipped hospital for contagious diseases, which should be modern and comfortable—not the disgraceful makeshift which has quite properly been stigmatized by the name of "pest-house." When no such institution is within reach the patient should be isolated in a large, well-ventilated room which has been stripped of all unnecessary furniture. A good nurse should be provided to attend the patient, and outside commu-

nication, except what is required for necessities, cut off. The physician in his visits to the sick-room should wear a linen duster or other washable garment over his clothing; the latter should be changed before visiting other patients, and face, hands, hair and beard washed painstakingly in a bichlorid solution. Discharges coming from the patient and badly soiled linen should be burned. Everything coming in contact with him should be washable and after use sterilized in bichlorid solution and boiled. Room disinfection following the sickness must be very thorough.

Hygiene and Diet.—Even in mild cases the patient should be confined to bed. Frequent bathing adds to the comfort, reduces the temperature, diminishes the severity of the eruption and prevents complications. The diet should be that of all febrile diseases—largely liquid. Milk, buttermilk, koumiss, malted-milk, chicken or mutton both, bouillon, soft-boiled eggs, soft toast, ice-cream, fruit jellies, liquid peptonoids, etc., are suitable. Acid drinks, as lemonade, or orange juice are often very grateful.

General Treatment.—During the primary or pre-eruptive stage the symptoms calling for treatment are the fever and the pain in head, muscles and back. For the first, sponging with cold water is best, or in severe cases the cold bath, though this is rarely necessary. Fever may also be reduced by the use of phenacetin, acetanilid, phenalgin, ammonol, antipyrin or similar preparations, which also relieve the pain. The following is a suggested formula, especially if there are nervous symptoms:

Antipyrin	dr. 3—4
Sodium bromid	dr. 3—6
Spts. ammon., arom	oz. 1
Syrup orange	oz. ½
Water, enough to make	oz. 4

Teaspoonful in water every two to four hours.

Morphin, hypodermically, must sometimes be resorted to.

Vomiting is often a troublesome symptom. This may be relieved by an initial dose of calomel (5 to 10 grains), or the calomel may be given in small, frequently repeated doses (¼ to 1 grain every one-half to one hour); or the following may be administered:

Calomel .....gr. 3
Powd. ipecac .....gr. 1
Bismuth subnitrate .....dr. ½

Make 12 powders. One every hour for five or six doses. Follow with citrate of magnesia or other saline.

Diarrhea calls for the intestinal antiseptics and astringents, as bismuth subnitrate, subgallate or salicylate, acetate of lead, tannogen, etc.

Cracked ice or a little iced champagne is also grateful and often efficacious in cases of irritable stomach. Stimulation by alcohol is required in the severe cases and especially during the secondary fever, when the system is likely to require support to resist the septic process. Strychnin, quinin, digitalis, ammonia and other supportive drugs may be required in large doses during this stage.

There is no specific treatment for smallpox; no drugs taken internally seem greatly to modify its course, though xylol, sodium salicylate, the sulphocarbolates, creosote and other antiseptics have been taken with this end in view. Serum treatment has also failed thus far.

Local Treatment.—The agents used locally are very diverse. The treatment of the patient in an atmosphere of red light, as proposed by Finsen, is effective, if at all, by excluding the violet or actinic rays, which are irritant to the skin. Local treatment has been mainly addressed to the preventing of pitting, but it seems, from numerous reports, that the use of antiseptic solutions upon the skin has a decided influence in modifying the severity of the symptoms, especially during the secondary fever, which is due mainly to the absorption of poisons from the suppurating skin lesions. Bathing or scrubbing the surface with an aqueous solution of bichlorid of mercury was advocated by T. C. Osborn of Texas in 1894, who claimed priority for its use. The strength of solution employed varies from 1 to 500 to 1 to 5000. Strong solutions may, however, be used with safety, since the drug is very slowly absorbed from the unbroken skin. The value of this method of treatment was remarkably shown by Woodson during the epidemic at Holguin, Cuba, in 1899. Others had, however, employed bichlorid before Osborn. Talamon, in 1891, recommended the drug to be employed as a spray, using the following formula:

Mercuric chlorid	gr. 15
Tartaric acid	dr. 15
Alcohol (90 per cent)	dr. 1½
Ether, enough to make	oz. 1½

To be applied as a spray three or four times a day. The face should first be washed with soap and water, rinsed with boric acid solution, dried with absorbent cotton, and followed with a layer of 50 per cent of glycerolate of mercuric chlorid.

In using corrosive sublimate care must be taken not to get it into the eyes. Osborn washes out the eyes and the nasal and oral cavities with a solution of peroxid of hydrogen. This or some other simple antiseptic, such as boric acid or listerine, should be used to keep the mucous surfaces clean and antiseptic.

Other antiseptics are also used locally. Galewouski bathes his patients with strong solutions of potassium permanganate; others have used carbolic acid solution. Numerous other applications have been proposed especially with a view to relieving the itching and preventing pitting. Older methods are to touch the pustules with silver nitrate or carbolic acid, to paint with tincture iodin or collodion, and to apply ointments and pastes. The last are still much used, often being spread upon gauze or lint and applied to the face as a mask. A modification of Lassar's paste should be as useful as anything:

Thymol	gr. 5
Carbolic acid	gr. 10
Zinc oxid	oz. ½
Starch	oz. ½
Petrolatum	oz. 1

But in general the antiseptic solutions are probably more satisfactory.

VITILIGO; LEUKODERMA.

Definition.—An affection of the skin, characterized by the appearance of whitish patches, surrounded by areas of increased pigmentation.

Etiology.—Vitiligo is most common in the colored race, and is usually confined to adults. Its etiology is obscure, but nervous influences seem to be a factor in its production.

Symptoms.—The condition consists in the appearance on the skin of white patches of irregular outline, due to disappearance of the pigment. The surrounding skin becomes more deeply

pigmented, taking on a yellowish-brown color in Caucasians. There are no structural changes. Several of these patches may coalesce and form large areas in which the skin is milky-white. The progress of the disease is slow but continuous. The backs of the hands, neck and trunk are most frequently affected. Any

FIG. 13. VITILIGO (*Med. World*).

hairs on the patch are also turned white. A very striking appearance is given to the skin of the negro by this disease, and, in popular parlance, he is often said to be "turning white." The accompanying illustration is of a case reported by Dr. Downs in the Medical World.

DIAGNOSIS.—This is made without difficulty. In chloasma and tinea versicolor the patches are dark. In leprosy there may be whitish spots, but they are anesthetic.

PROGNOSIS.—The condition is usually considered incurable and tends to spread, but it does not affect the health.

TREATMENT.—The condition is seldom if ever modified by

treatment. The general nervous tone should be built up by proper diet, regulation of the habits and the administration of tonic and reconstructive remedies. Arsenic is advised by some authors; it should be given in small doses continued for a long time. Solutions of corrosive sublimate, acetic acid, etc., may be applied locally, but probably do no good.

WARTS; VERRUCA.

DEFINITION.—Small, benign epithelial tumors.

ETIOLOGY.—Warts are probably caused by infection with microorganisms. They are believed to be autoinoculable and contagious. Venereal warts are caused by contact with irritating secretions.

PATHOLOGY.—These little tumors are the result of multiplication and accumulation of the epithelial cells in a circumscribed area with a central vascular core of connective tissue derived from the underlying papillary layer of the corium.

SYMPTOMS.—The appearance of a wart is too well known to require description. There are, however, a number of varieties which require special mention.

The common wart (verruca vulgaris) is a small, lobulated, cauliflower-like growth in which the horny layer of the epidermis is most prominent.

The flat wart (verruca plana) is not common and is most frequently seen on the backs of elderly men. They are but slightly elevated above the surface, darker in color and as large over as a pea or as the finger-nail.

Filiform warts (verruca filiformis) are thread-like growths sometimes found on the eyelids, face and neck.

Digitate warts (verruca digitata) are a variety most frequently seated on the scalp and marked by digitations reaching down nearly to the base.

Venereal warts (verruca acuminata) are found upon the muco-cutaneous surfaces of the genitals or around the anus, and consist of groups of pointed raspberry-like growths, which may be dry or moist, in the latter case giving off a yellowish, offensive secretion. The epithelial element is not so prominent in these warts; they are pinkish or reddish in color and may reach considerable size.

TREATMENT.—These unsightly little tumors are often the source of considerable annoyance, and the physician who can remove them is certain to have grateful patients. Many remedies are used, including some mysterious charms and incantations, which still have their votaries. The quickest method of removing them is by the thermo-cautery, by the knife or scissors if they are sufficiently elevated, or by the use of an active cauterizant like glacial acetic acid, fuming nitric or nitrohydrochloric acid or the solution of the nitrate of mercury. Care must, however, be exercised in the use of these agents, since they act very rapidly and powerfully and may destroy a good deal of tissue—too much, in fact. Small quantities of the drug should be applied at a time and repeated as frequently as may be necessary until the wart is entirely gone. Another active remedy is sodium ethylate (10 per cent). This is highly recommended by W. C. Abbott (Alkaloidal Clinic). He applies it in the following manner: The growth to be treated should be walled in with a bit of wax or vaseline or mutton tallow, whatever of this nature is handy, and then a drop of the solution should be placed on its very tip. After two or three minutes, any remaining portion should be absorbed with a blotter. A caustic effect occurs which kills quite deeply, forming a dark scab which peels off and leaves the parts normal. If the growth is quite thick, one or two subsequent treatments may be required. Chromic acid is also a useful remedy and may also be applied with a camel's-hair brush as in the following:

Chromic acid	gr. 10—60
Water	oz. 1

Usually, however, the patient will prefer a slower and less painful cure. Before making applications it is wise to remove the dry upper layers with a sharp knife or curette. One of the best remedies is formalin (40 per cent), which is applied with a toothpick or glass rod twice daily. This hardens the wart and causes it to crumble away. The nitrate of silver stick used daily is often effective. Mercury in solution or ointment, salicylic acid, sulphur and arsenic are among the remedies used. Isadore Dyer (New Orleans Med. and Surg. Jour.) recommends the following:

Mercuric chlorid .....gr. 3
Sulphur .....dr. 1
Cold cream .....oz. ½
Rub in and leave over night.

A formula suggested by Vidal is:

Salicylic acid .....dr. ½
Alcohol .....dr. ½
Sulphuric ether .....m. 75
Collodion .....dr. 2½
To be painted on daily.

J. Abbott Cantrell suggests:

Salicylic acid .....gr. 30
Cold cream .....oz. ½
Use twice daily for two days. The wart may then be removed with the curette.

Another good formula is:

Mercuric chlorid .....gr. 5
Salicylic acid .....dr. 1
Collodion .....oz. 1

A formula suggested by Kaposi contains:

Sulphur .....dr. 10
Glycerin .....dr. 25
Glacial acetic acid.....dr. 5

Another formula contains:

Arsenous acid .....gr. 2
Mercurial ointment .....oz. ½

Chrysarobin is claimed to be a specific for warts. It is applied in a 10 per cent solution of the gutta percha solution or a 10 per cent ether solution, painted on once a day.

Venereal warts require cleanliness, astringent applications, boric acid, alum, bichlorid solution (1 to 1000), tincture of iron, the salicylic ointment or lotion above, or in severe cases, the caustic acids, as described.

WHOOPING-COUGH; PERTUSSIS.

DEFINITION.—An acute contagious disease of the upper air passages, usually occurring in children and characterized by catarrhal inflammation and a spasmodic cough which terminates in prolonged inspiration, causing a peculiar sound or "whoop."

ETIOLOGY.—Whooping cough often occurs sporadically, but most of the cases are seen in epidemics. It prevails most dur-

ing the winter months. It is essentially a disease of childhood, seldom occurring after the tenth year; no age is, however, entirely exempt. The disease is highly contagious and is probably caused by a specific germ; this has not yet been positively identified, although Afanassiew, Koplik and others have described bacilli which have been found in the sputum of patients suffering from pertussis which are believed by them to be specific. Infection is probably carried by the expectoration. Whooping-cough often follows epidemics of measles, perhaps on account of the increased sensitiveness of the mucous membrane of the upper air passages. One attack confers immunity.

PATHOLOGY.—There are no morbid changes characteristic of the disease. There is a naso-pharyngeal catarrh which may extend to other portions of the respiratory tract and produce various complications. The pathogenesis of the disease, or rather the nature of its clinical phenomena, has not been clearly explained. The presence of the poison in the air passages probably causes in some way an irritation which excites paroxysmal stimulation of the pneumogastric nerve.

SYMPTOMS.—The *period of incubation* in whooping-cough is from four to fourteen days: the average is about eight days.

The disease cannot at first be distinguished from an ordinary "cold." During the first or *catarrhal stage* there is coryza, a troublesome hacking cough which is not relieved by the usual remedies, and slight feverishness. As the disease progresses the cough becomes more troublesome and especially so at night, the nose runs and the eyes are suffused. At the latter part of this stage, according to Anders, the physiognomy is characteristic: "The face is swollen, the eyes suffused and watery, the underlids swollen and pink in color."

In one or two weeks the *paroxysmal stage* commences. The cough is now characteristic. It consists of a number of rapidly repeated "barking" expiratory sounds, followed by a prolonged whistling inspiration, the "whoop," caused by spasmodic narrowing of the glottis. A single paroxysm may occur at a time or several may follow in rapid succession until the child is exhausted. Quite an amount of stringy mucus is coughed up or vomited. Vomiting usually follows the paroxysm, and if this occurs frequently the inability to retain sufficient food in the

stomach may seriously impair the child's nutrition. The attitude and appearance of the child during an attack of coughing is characteristic; it leans forward and rests the arms upon the knees, a chair, the mother's lap or any convenient object, in order to bring into play all the accessory muscles of respiration. The face is anxious and becomes swollen, suffused and almost livid before relief comes. The eyes are congested and there may be conjunctival ecchymoses or nosebleed. The frenum may become ulcerated from forcible contact with the teeth during coughing. Incontinence of urine or of feces is not infrequent. A paroxysm may be excited by exposure to cold air, running, laughing, inhalation of dust, eating, drinking and other slight causes. The number of attacks daily varies greatly; there may be from ten to forty during twenty-four hours. The duration of the paroxysmal stage averages three or four weeks. It is followed by the *stage of decline,* during which the symptoms subside, the paroxysms diminishing in number and severity. A dry, nervous cough may remain for a short time.

COMPLICATIONS AND SEQUELAE.—The most serious and a not infrequent complication of whooping-cough is bronchopneumonia. It is to be suspected when the paroxysms become less frequent and are replaced by dyspnea and the temperature rises. Bronchitis, emphysema, pleurisy, pericarditis, collapse of the lung and tuberculosis sometimes occur as complications or sequelæ. The violent coughing may produce a hernia. Acute nephritis quite frequently follows the disease; the physician should examine the urine frequently. Convulsions are common in young children. Paralyses, aphasia and neuritis are rare nervous complications. Whooping-cough is often followed by marked emaciation.

DIAGNOSIS.—Before the appearance of the paroxysmal stage the diagnosis of whooping-cough is difficult, often impossible. Special stress has been laid upon the swollen, cyanotic appearance of the face and the puffiness and pinkish shade of the lower lids; these symptoms may often be noted before the paroxysmal stage begins. The "whoop" may be absent. This is often the case in very young children and upon the development of pulmonary complications. The "whoop" when present is characteristic and makes the diagnosis easy.

PROGNOSIS.—Good, except in very young children; whooping-cough is often fatal to children under one year of age. Debility increases the gravity of the prognosis. Very old people do not bear the disease well.

TREATMENT. — *Prophylactic.* — Whooping-cough is treated much too lightly, not only by the laity but also by members of the medical profession. It is a highly contagious disease and to infants an extremely fatal one. Quarantine is therefore little less important than in cases of scarlet fever and measles, yet too often children suffering from the disease are allowed to mingle freely in school and elsewhere with other children who are not immune. This should never be allowed. The child should be kept at home for at least three weeks after the spasmodic stage has ceased. Clothing worn by the patient and bed-linen should be thoroughly disinfected, while perfect cleanliness of person and surroundings and free access of sunlight and air into all living-rooms should be insisted upon.

Hygienic and Dietetic.—Good ventilation and fresh air are important. It has been suggested that an occasional change of sleeping-room will often be beneficial, a thorough airing being given to the one not in use. The patient should have daily out-door exercise, even during cold weather, unless it is extremely cold or there is much wind, rain or moisture. Excitement and overexertion of any kind should not be permitted.

Great care must be given to the diet. On account of the frequency of vomiting it is necessary to give food in small quantities and at frequent intervals in order to secure the retention of sufficient nourishment. Food should be highly nutritious and easily and quickly digested. Milk, malted-milk, soft toast, broths, soft eggs, custards, etc., are suitable articles of diet. If the stomach is very irritable lime-water or a carbonated water may be used to dilute the milk. Liquid peptonoids and panopepton are excellent proprietary liquid foods which are usually well retained.

General Treatment.—If the patient is seen during the *stage of invasion* a simple sedative fever mixture may be prescribed, as the following:

Tinct. aconite .....gtt. 8
Potassium citrate .....dr. 2
Paregoric .....dr. 3
Syrup ipecac .....dr. 3
Syrup tolu .....oz. 1
Water, enough to make.....oz. 4
Teaspoonful every two hours for child two years old.

Cough mixtures, as a rule, are useless, but if there is a tendency to bronchial invasion as shown by severe cough, copious expectoration, cyanosis and relaxation of the skin, ammonium chlorid or carbonate, or aromatic spirit of ammonia may be added to the mixture given above or a similar one.

For the relief of the *spasmodic stage* a multiplicity of remedies have been recommended. There is no specific, but certain drugs undoubtedly exercise a marked influence upon the number and severity of the paroxysms. Kerley, after a careful and systematic study of drug values in 752 cases, found antipyrin, the bromids and quinin the most valuable remedies in the order named. In giving drugs, depressants should be avoided if there is a suggestion of bronchopneumonia or the circulation is weak. *Antipyrin,* according to Kerley, is not depressing when given in reasonable doses, and it controls the number and severity of the attacks, sometimes both, better than any other drug. Many other authors bear similar testimony as to its value. The dose varies from ½ to 2 grains, according to age, every two hours. The rule of Sonnenberger is to give one centigram (1/6 grain) for every month of the child's age; this dose would seem unnecessarily large in most cases. J. M. Taylor combines antipyrin with ammonium chlorid. This would seem of special value when expectoration is copious and cyanosis marked.

Antipyrin .....gr. ½—1
Ammonium chlorid .....gr. 2½—5
Syrup lemon .....dr. ½
Water, enough to make.....dr. 1
One dose.

Galvagno praises a combination of resorcin with antipyrin:

Resorcin .....gr. 15
Antipyrin .....gr. 15
Syrup orange flowers.....oz. 1
Syrup acacia .....oz. 3½
Dessertspoonful three to five times daily.

Koplik uses:

Tinct. digitalis	m. 15
Antipyrin	gr. 30
Camph. tinct. opium	dr. 1
Syrup tolu, enough to make	oz. 2

Half a teaspoonful three times a day.

The *bromids* of potassium and sodium undoubtedly diminish the severity of the spasms. The sodium salt is least likely to disturb the stomach. They must be given in full doses, from 8 to 16 grains within twenty-four hours to a child one year of age. The combination of antipyrin and the bromids seems to be even more effective than either of these remedies alone. The following is suggested:

Antipyrin	dr. 1
Sodium bromid	dr. 1½
Arom. spts. ammonia	dr. 3
Syrup raspberry, enough to make	oz. 4

Teaspoonful every two hours for child two years of age.

The antipyrin and sodium bromid may be given if preferred, in a compressed tablet. Chloral is also used alone or with the bromids.

Belladonna is one of the oldest and is still a favorite remedy with many practictioners. In order to be effective it must be pushed until its physiological effects are produced, viz., flushing of the face and dryness of the throat. Jacobi gives 10 drops of the tincture three times a day to a child six years old, increasing the dose if necessary to produce flushing. Minim doses of the tinctures are usually sufficient for an infant of eight months. The disagreeable symptoms which the drug produces is an objection to its long-continued use. Kerley and others assert that it does not modify the disease, or at least only slightly. It may be combined with other remedies to advantage. Trousseau used:

Powdered belladonna	gr. 4
Aq. ext. opium	gr. 4
Ext. valerian	dr. ½

Make 16 pills. One to four daily.

An old and useful prescription is:

Tinct. belladonna	gtt. 20
Wine ipecac	gtt. 16
Syrup tolu	oz. 2

Teaspoonful every three hours.

Or belladonna may be given with antipyrin in the following tablet:

Antipyrin	gr. 2
Ext. belladonna leaves	gr. $^1/_{20}$
Zinc oxid	gr. ½
Fl. ext. castanea	m. 1

Quinin has undoubted value in whooping-cough, but its bitter taste with the consequent difficulty of administration and its likelihood to disturb the stomach are decided objections to its use. It must be given in large doses, 12 to 20 grains daily for a child two to six years of age. It may be administered in rectal suppositories or by inunction.

Alum, which was first recommended by Golding-Bird, is warmly praised by Meigs and Pepper. The dose is from ½ to 2 grains, according to age. A child of one year may take the following:

Ext. belladonna	gr. 1
Alum	dr. ½
Syrup ginger	oz. 1
Syrup acacia	oz. 1
Water	oz 1

Teaspoonful four times a day.

Bromoform has recently been much used and often with benefit. Mixtures containing it should always be dispensed with a "shake label," since the drug tends to accumulate in the bottom of the bottle. One to five drops, according to age, may be given. Some formulas are given:

Bromoform	gtt. 10
Alcohol, a sufficient quantity.	
Syrup orange flowers	dr. 1
Simple syrup	oz. 2

Teaspoonful several times a day, according to age.

Bromoform	m. 15—30
Tinct. aconite	m. 4—8
Alcohol	dr. 2½
Syrup codein	dr. 1½
Syrup tolu	
Syr. orange flowers, enough to make	oz. 2

Teaspoonful several times a day.

W. L. Scoville, the editor of the Spatula, in a letter to Pediatrics, recommends the following bromoform mixture, which has the advantage of containing a minimum of alcohol, is suscep-

tible to a change of dosage and while the emulsion slowly deposits, does so without separation of the bromoform. This is important, since the heaviness of the drug and its tendency to settle makes it sometimes a dangerous medicine.

Bromoform .....dr. ½
Tinct. tolu .....dr. 1
Mucil. acacia .....dr. 2
Syrup .....dr 4
Peppermint water, enough to make.....oz. 4

Place the mucilage in the bottle, add an equal volume of syrup, then add the bromoform and tincture of tolu in portions, shaking well after each addition. A thin emulsion ensues, to which the rest of the syrup and the mint water are to be added, with agitation.

Anders depends mainly upon asafetida. When the cough is fully established he gives the mixture of asafetida, ½ dram, every two hours with suitable local treatment.

Opium or its alkaloids may be used with benefit for relief of coughing. It is not adapted for prolonged administration. Codein is the most satisfactory of the alkaloids; the sulphate may be given in solution with syrup lactucarium. Conium, hyoscyamus, castanea, phenocoll and dilute nitric acid are among the other drugs used in this disease. Ipecac may be given advantageously to produce vomiting, when the mucus is raised with great difficulty.

Local Treatment.—Inhalations of various vapors often prove useful in the treatment of whooping-cough. A popular method of treatment in cities is to take the child to the gas-works; the beneficial result is probably due as much to the comparatively pure air as to the inhalation of gases. Decided relief follows inhalations of steam; these may be obtained by the use of a steam atomizer or may be extemporized by surrounding the spout of an ordinary teakettle with a paper funnel, near which the child's face is held. Turpentine, creosote, thymol or eucalyptus oil may be added to the water so as to make the vapor antiseptic, if so desired. Or any of these antiseptics may be added to water and kept simmering on a stove or over an alcohol lamp in order to keep the air saturated with the vapor.

Of these remedies probably creosote is the most popular and is enthusiastically praised by many; its continuous inhalation

seems to give the most satisfactory results. A simple and effective method, according to Godson (British Medical Journal) is to sprinkle the drug on a cloth and hang it in the sick-room to dry. Vapo-cresoline is a proprietary coal-tar product, vaporized with a specially made lamp. It is much used and gives good results.

During severe paroxysms it may sometimes be necessary to resort to inhalations of chloroform or nitrite of amyl, used with caution. J. M. Taylor recommends:

Amyl nitrite .....dr. ½
Spts. chloroform .....dr. 3
Sulphuric ether .....dr. 5

A few drops on a handkerchief held to the nose during a paroxysm.

If there seems to be impending asphyxia, cold water may be sprinkled on the neck, face and chest, the feet may be placed in hot water or a hot general bath given.

External applications are often made to the skin. A belladonna or asafetida plaster may be applied to the chest. Various liniments, "embrocations" and ointments have been used.

Antitussin is enthusiastically praised by Heim, who claims wonderful results from its use. It is an ointment composed of difluordiphenyl 5 parts, vaselin 10 parts, and 85 parts of lanolin. "Neck, chest, and back between the shoulders are thoroughly cleansed with warm soap-suds and thoroughly dried with a rough towel. Then antitussin as much as a hazel-nut is spread over the prepared surface and energetically rubbed into the skin with the palm of the hand. Inunction is to be performed in the manner of massage and must be continued until entire disappearance of the ointment is perceptible to the hand."

Direct applications to the nose and throat are recommended by most clinical authorities, for their germicidal effects. A gargle or spray of equal parts of hydrogen dioxid and glycerin diluted with two or three parts of water and used in the catarrhal stage, will, according to Anders, shorten the duration of the disease. Other sprays used contain carbolic, salicylic and boric acids, resorcin, etc. Resorcin in one-third per cent solution applied to the glottis every four hours is warmly praised. Various powders are also recommended for insufflation, but

their use is often impracticable in private practice. Quinin is the most useful of these and is undoubtedly of marked value. Cleansing the nostrils and throat thoroughly with an alkaline solution such as Dobell's solution or glyco-thymoline, followed by a spray of menthol in liquid petrolatum (10 grains to the ounce) is a useful measure. Formalin has recently been proposed as a specific. It may be used in 1 per cent solution as a spray, or the 5 per cent solution directly to the pharynx. Olliphant asserts that it is "as much of a specific for pertussis as mercury for syphilis," and that by its use "the course of the disease may be shortened from six weeks to six days." Coggeshall suggests that the nasal mucous membrane be cocainized, then a 2 to 4 per cent solution of silver nitrate applied to the nose and naso-pharynx, followed by a mild alkaline and antiseptic wash. He also suggests the use of suprarenal extract.

WORMS, INTESTINAL.

TAPEWORMS.

VARIETIES.—The common varieties are: (1) Tenia saginata; (2) tenia solium; (3) bothriocephalus latus.

Tenia Saginata.—This is the most common variety of tapeworm, not only in this country but also in Europe. It is obtained by eating raw or imperfectly cooked beef. It is one of the longest of the tapeworms, being 12 to 20 feet in length. Its head is roundish, little larger than a pin-head and provided with four suckers; it has no hooklets. The segments average from two-thirds to three-fourths of an inch in length; they are slightly elongated.

Tenia Solium.—This worm is obtained from eating measly pork. It is rare in this country but quite common in portions of continental Europe, especially in Germany. It is a shorter worm than the tenia saginata, being from 6 to 12 feet in length; its head is slightly smaller and provided with four suckers between which is a prominence or rostellum and two rows of hooklets. The segments are usually less than half an inch in length.

Bothriocephalus Latus.—This variety is derived from fish. It is very rare in America and most common in Russia, Ireland, Switzerland, the Prussian coast, and Japan. The head is flat

and club shaped and has no hooklets, but lateral grooves. The segments are very short and very broad. The worm is a long one.

Life History.—The segments of the worm contain the sexual apparatus, which is hermaphroditic, being made up largely of a uterus and its numerous ramifications. These uteri contain the ova, which are from time to time emptied into the bowel and escape with the feces. The dejecta are eaten by animals in whose intestinal tracts the outer coverings of the eggs are digested, thereby allowing the embryos to escape; these migrate through the walls of the intestine into the muscular tissues where they form "measles" or cysticerci. If raw meat containing a "measle" is taken into the stomach of a human being the embryo develops and the newly formed head attaches itself to the wall of the small intestine; from this the segments develop.

Symptoms.—The only positive evidence of the presence of a tapeworm in the bowel is the recognition of the segments in the stool. Other symptoms are nausea, loss of appetite, or sometimes increased desire for food, flatulence, constipation or diarrhea, loss of flesh, and various nervous symptoms, including dizziness, headache, disturbed sleep and even convulsive attacks. Itching of the nose and of the anus are sometimes observed. Anemia is occasionally a pronounced symptom.

Prognosis.—Good, although there may be some difficulty in obtaining the head. If this is allowed to remain the worm redevelops.

Treatment.—The habit of eating raw meat should be discouraged, since the worm practically always obtains access to the body in this manner. Thorough cooking destroys the cysticerci.

Many remedies have been proposed for tapeworm. The object of all of them is the removal of the worm entire; if the head is allowed to remain it will rapidly reproduce itself. The patient should be given a thorough cathartic, as calomel, and kept on a liquid diet for two or three days before administering the chosen remedy. In order to keep the intestinal tract empty a daily morning dose of some saline laxative will be useful. A thorough evacuation should be obtained within the twenty-four hours prior to giving the anthelmintic. The patient should usually retire the preceding night without partaking of food; the following morning the vermifuge is given. Probably the favorite is

the oleoresin of male fern; the dose is 1 to 2 drams and it is conveniently administered in soft capsules. It must be fresh, as the drug soon deteriorates. It may be combined with castor oil or other vermifuge, but the simpler preparation is usually just as effective and less likely to disturb the stomach than a nauseous mixture. If there is a tendency to vomiting it may sometimes be relieved by drinking small quantities of black coffee. Two hours after giving the remedy a purgative should be taken, as castor oil (1 or 2 ounces).

Kousso is also recommended. The dose is ½ to 1 ounce; it may be given in four doses, half an hour apart, administered in wine or water. Freshly prepared pomegranate bark decoction (2 to 4 ounces to the pint of water, boiled for half an hour) or its alkaloid pellitierine (5 to 8 grains) may also be tried. Other remedies are pumpkin seeds (4 to 8 ounces made into an emulsion or bolus), kamala (2 to 4 drams taken in wine or fennel water), turpentine (2 to 4 drams), chloroform (1 dram), salol, etc. The vermifuge should be taken in a single or divided dose and followed by a cathartic as directed above.

NEMATODES.

Varieties.—Those usually found are (1) the ascaris lumbricoides, or round worms, and (2) the oxyuris vermicularis—seat-worms or pin-worms.

Ascaris Lumbricoides.—These are round worms, of a reddish or brownish color, the males 4 to 8 inches long and the females 6 to 10, somewhat resembling the ordinary earth worm in appearance. They are the most common of intestinal worms and are frequently found in young children. Their habitat is the small intestine, but they sometimes migrate upward into the stomach and even into the mouth. They are often evacuated by way of the anus. They reproduce by means of ova which pass with the feces and become a productive source of infection.

Symptoms.—These may be absent or obscure. Indigestion, fitfulness of appetite, colicky pains, dizziness, fretfulness, disturbances of sleep, grinding of the teeth at night, itching of the nose and anus, chorea and convulsive attacks are among the symptoms noted.

Treatment.—Santonin is the remedy par excellence for

round worms. It may be given alone in 1 or 2 grain doses (less for very young children) night and morning or with calomel in the following powder or tablet triturate:

Santonin .....gr. 1—2
Calomel .....gr. 1

In either case it is well to follow with a dose of castor oil. While taking the anthelmintic the child should be kept on a very light, liquid diet of soups or broths. Perfect cleanliness is essential, since the ova are easily picked up under the finger nails and transferred to the mouth.

Oil of wormseed is an old and favorite remedy. The dose is 5 to 10 minims on lump sugar two or three times daily, followed by a purge.

OXYURIS VERMICULARIS.—This is a very small, white thread-like worm, one-tenth to one-fifth inch in length. They infest the colon or rectum, but in female children may migrate into the vagina. They cause severe itching, usually worst at night, thereby disturbing the sleep, making the child restless and nervous.

TREATMENT.—Santonin is given with good results in the same manner recommended for ascarides. The greatest benefit is, however, to be obtained by injections into the rectum. Infusion of quassia, salt and water, a weak bichlorid solution, thymol solution, benzene (a few drops in solution), vinegar and water, etc., are recommended.

YELLOW FEVER.

DEFINITION.—An acute infectious disease found almost exclusively in tropical and sub-tropical countries and characterized by high fever with an interval of remission, vomiting, jaundice, hemorrhages and albuminuria.

ETIOLOGY.—Yellow fever is a disease of warm climates and is endemic in some of the West Indian and South and Central American ports. Severe epidemics have occurred from time to time in our southern American states. That northern cities are not necessarily exempt was shown a little more than a century ago, when epidemics of the disease carried off thousands of people in Philadelphia, New York and Boston. It usually occurs in localities at or near the sea level and especially at

sea-ports and along streams; the disease never flourishes at an altitude of even a few hundred feet. Good sanitation and hygiene greatly diminish the probability of its spread. The disease is most likely to attack unacclimated persons; and negroes, while not exempt, usually have it in a mild form. The duration of an epidemic averages about six weeks; it is generally brought to a termination by a sharp frost. One attack confers immunity for life in the majority of cases.

Yellow fever is undoubtedly due to infection with a specific germ, though the nature of this organism is not yet settled. Sanarelli has described a bacterium, which he calls the bacillus icteroides, that he strenuously insists is the cause of the disease; but he was able to find this bacillus in only 56 per cent of his cases. Wasdin and Geddings, sent by the U. S. Marine Hospital service to Cuba to investigate the cause of the disease, decided in favor of the Sanarelli bacillus. On the other hand Surgeon-General Sternberg of the U. S. army thinks the evidence insufficient to prove that this germ is the causative factor. He has described the bacillus-X as a possible contestant of the claim. Investigators sent to Brazil by the Liverpool School of Tropical Medicine—Drs. Durham and Myers—have recently reported the finding of a small bacillus in the organs of all fatal cases. The bacteriology of the disease is plainly not yet settled.

We are indebted to medical officers of the U. S. army for brilliant work which seems to settle definitely one and probably the main mode by which the disease is transmitted. In 1900 and 1901 investigations were made by Drs. Reed, Carroll, Lazear and Agramonte showing that yellow fever is transmitted by the bite of mosquitoes which have fed upon the blood of persons suffering from the disease. This mosquito theory was first suggested by Dr. Carlos Finlay in 1881. Drs. Carroll and Lazear submitted themselves to be bitten by infected mosquitoes. Both had yellow fever and Dr. Lazear died. These experiments have since been repeated upon a number of other non-immune persons under test conditions and it is now reported (Pan-American Congress, 1901) that in 80 per cent of the cases the tests were successful, provided an interval of twelve days was allowed after the mosquito was infected before the bite was given; this interval seems necessary before the insect can convey infection. A

further test was made in another building, carefully screened to keep out mosquitoes. Seven non-immune persons slept each an average of three weeks in the beds occupied by persons who had had yellow fever, using the bed linen soiled by their fecal and other discharges and wearing their clothing—yet not one of them took the disease. This seems to settle conclusively the theory that it is communicated by fomites. There can be now no doubt that yellow fever is transmitted mainly by mosquitoes. The variety of mosquito is commonly known as the Culex fasciatus. Theobold (Howard's "Mosquitoes") places it in another genus, calling it Stegomyia fasciata.

PATHOLOGY.—After death the tissues retain their yellow hue. The liver is icteroid, shows hemorrhagic spots and has undergone extensive fatty degeneration. The gastric and intestinal mucosa is inflamed and eroded and the alimentary canal often contains blood. The heart muscle is degenerated and the blood dark and slow in coagulating. The brain, kidney, lungs and other viscera also show evidences of a profound toxemia.

SYMPTOMS.—The period of incubation in the experimental cases of yellow fever just discribed varied from forty-one hours to five days and seventeen hours. It is probably longer than this in some cases.

First Stage.—The disease commences abruptly, often in the night, with a chill or chilliness and an immediate rise of temperature which reaches 104° to 105° F. within twenty-four hours. The pulse is slow in proportion to the fever. Associated symptoms are severe headache, pains in the back and limbs, prostration, tenderness of the epigastrium, anorexia, nausea and often vomiting. John Guiteras (U. S. Marine Hospital report, 1898) places great emphasis upon the facies: The face is flushed, the eyes injected and watery and there is, even very early in the disease, a slight yellowness of the sclerotics best seen at a little distance; icterus becomes more intense as the disease progresses. There is usually constipation. Albuminuria is a very important symptom, albumin appearing in the urine usually on the third or fourth day. About this time there is a subsidence of fever and the temperature falls to normal.

Second Stage.—This is the stage of remission, during which all the symptoms abate. In very mild cases convalescence fol-

lows; usually, however, after a temporary calm of a few hours the patient passes into the next stage.

Third Stage.—This is the stage of collapse, during which the temperature may be normal or subnormal or be greatly elevated. The skin is dyed a deep yellow hue, the urine is scanty, often suppressed, and contains albumin, bile and casts; vomiting is persistent and the vomitus may contain blood ("black vomit"). Hemorrhages from other mucous surfaces and into the skin are common. The pulse remains slow. The mind is usually clear nearly to the last, even in fatal cases. Convalescence is very tedious.

Diagnosis.—The differentiation from Dengue has already been given (see Dengue). Malaria is the only other disease with which yellow fever is likely to be confused. The typical course, distinct periodicity, and absence of albuminuria of the former are usually distinctive. Murray (U. S. Marine Hospital report) lays considerable stress upon the fact that the malarial tongue is large, indented by the teeth and thickly coated, while the yellow fever tongue is small, pointed and has a red tip and edge.

Prognosis.—Differs in various epidemics. The mortality has reached 75 per cent or more, but in recent years the death-rate has been very low—10 to 15 per cent. Negroes have the disease, as a rule, in a milder form than whites. It is also much less dangerous in children than in adults.

Treatment.—*Prophylaxis.*—Acknowledging that yellow fever is transmitted by mosquitoes, the problem of prevention is much simplified. It demands (1) the destruction of as many as possible of the insects in localities subject to the occurrence of this disease. All ponds, swamps, and stagnant pools of water should be drained so far as possible. Coal-oil spread upon the surface of water prevents the development of the larvæ; it is necessary to repeat these applications about twice a month. All houses in which cases of yellow fever have occurred should be thoroughly cleansed and any lurking mosquitoes destroyed. (2) It is important to prevent the access of mosquitoes to individuals suffering from the disease, since they become carriers of the infection. Sick-rooms should, therefore, be carefully screened for this purpose.

Medical Treatment.—As soon as possible after the beginning of the disease a cathartic should be administered, such as calomel (5 grains), one to three compound cathartic pills or a dose of castor oil. In some cases a saline acts best. If the stomach is very irritable from the start a number of small doses of calomel, followed by a bottle of citrate of magnesia, acts thoroughly and will be retained as well as anything. If the patient is seen during the chill a hot mustard foot bath will hasten reaction.

For the fever and the pains the Marine Hospital surgeons, Murray and Geddings, both claim the best results from the use of the coal-tar drugs, phenacetin, antipyrin, acetanilid, etc. These may be used in moderate doses at the inception of the disease. Their use should not be prolonged on account of the depression which they cause.

Vomiting is one of the most troublesome symptoms and often makes it difficult or impossible to administer food or medicines. The stomach should be kept at rest as far as possible. The food allowed should be milk and lime water, clam-broth, light soups and possibly ice cream. Drugs should be stopped if their use causes vomiting. A mustard draft should be placed upon the epigastrium, and pieces of ice, iced champagne or brandy, Apollinaris, Vichy or some other carbonated water taken frequently in very small doses. In severe cases it may be necessary to administer small doses of morphin hypodermically. Geddings says that if nausea or vomiting persists cocain hydrochlorate, ¼ to ½ grain every hour or two, acts almost magically.

Geddings also recommends washing out the bowels with high enemas of warm soapy water. This carries away the extremely fetid fecal matter which is usually passed by yellow fever patients.

The most serious complications are "black vomit" and suppression of the urine. For the first the author just quoted thinks the tincture of iron chlorid the most efficient remedy. It is given in 15 to 30 minim doses every hour or two or after every act of vomiting. Counter-irritation with mustard and turpentine and the internal administration of turpentine are recommended for uremia, but their irritant character leads one to question their value. Stimulation of the functions of the skin

and bowels in the usual manner, and especially the use of hot salt solution by enteroclysis or hypodermoclysis, seems more rational.

There is, as yet, no specific for yellow fever. Sanarelli's serum has not proven of much value. Sternberg suggested the use of small doses of bichlorid of mercury internally, under the hypothesis that the habitat of the germ was in the intestinal canal. This position being no longer tenable the use of the drug is hardly rational—unless it serves to check putrefactive changes in the bowel. Small doses of salol, as used with success by Nunez, should be more satisfactory for this purpose. This physician also recommended the free use of a cream-of-tartar lemonade or limeade. This makes an agreeable refrigerant drink and reduces the danger of urinary complications.

Strychnin, digitalis, brandy and other cardiac stimulants may of course be used as needed.

APPENDIX.

APPENDIX.

EXAMINATION OF THE URINE.

An examination of the urine gives us information of the utmost importance, not only in Bright's disease and diabetes, in which it is a routine measure, but also in nearly every serious disease, acute or chronic. It should never be neglected in such cases, and it should be thorough, including not only tests to determine the presence or absence of albumin or sugar but also a quantitative estimation of the urinary solids and microscopic examination of the sediment. In order to understand abnormal urine it is necessary to know something of normal urine.

Physical Properties of Urine.

Quantity.—The normal quantity in an adult averages about 1500 Cc. (50 ounces) daily. This is increased (1) in cold weather; (2) by drinking large quantities of fluid; (3) by hysterical conditions; (4) by diabetes mellitus and insipidus; (5) by contracted kidney (interstitial nephritis). The quantity is decreased (1) by free perspiration; (2) when a small amount of fluid is drunk; (3) in fevers; (4) in diarrhea; (5) in congestion of the kidney; (6) in diffuse nephritis, acute and chronic.

Color.—Normal urine is straw-colored or amber. Its color depends upon the kind and quantity of the solid matters present. Pale urine is found where the quantity is large and the solids are highly diluted; high-colored urine is usually concentrated. An excess of urates, bile pigments, blood and certain drugs, as carbolic acid, salol, santonin, indigo, methylene-blue, rhubarb and senna, serve to color the urine. *Cloudiness* of the urine is caused by the presence of phosphates, mucus or pus, epithelium, blood and bacteria.

Odor.—Fresh normal urine has an aromatic odor. This is changed by some diseases. In diabetes it is sweetish, in alkaline cystitis it may be ammoniacal. The smell is also modified by certain vegetables, as asparagus or garlic, or by drugs, as turpentine, copaiba, valerian, etc.

Reaction.—Normally acid for the twenty-four hours. After meals it may be temporarily neutral or slightly alkaline. Acidity is increased (1) during fevers; (2) by a proteid diet; (3) when quantity is decreased. It is made alkaline (1) after eating; (2) when quantity is increased; (3) by vegetable diet; (4) by decomposition (alkaline fermentation) of the urine. The reaction is determined with litmus paper which is turned red by acids, blue by alkalies.

Specific Gravity.—The specific gravity averages about 1.020,

Considerable variations from this are consistent with perfect health. It depends upon the quantity of solids present, a concentrated urine being of high specific gravity. The specific gravity is low in diabetes insipidus and interstitial nephritis; high in diabetes mellitus and parenchymatous nephritis. It is conveniently determined by Squibb's urinometer.

Solid Constituents of the Urine.

The quantity of solids excreted by the urine in a healthy adult in twenty-four hours is shown by the following table:

Total solids	.....60 —70	Grams	..4.3 —4.6	per cent
Urea	.....30 —40	Grams	..2.5 —3.2	per cent
Uric acid	..... 0.4— 0.8	Grams	..0.03 —0.05	per cent
Kreatinin	..... 0.5— 1.0	Grams	.:0.036—0.062	per cent
Hippuric acid	..... 0.3— 1.0	Grams	.0.02 —0.06	per cent
Chlorids	..... 10 —13	Grams	..0.7 —0.8	per cent
Earthy phosphates	0.9— 1.3	Grams	..0.07 —0.08	per cent
Phosphoric acid	... 2.5— 3.5	Grams	..0.19 —0.22	per cent
Sulphuric acid	.... 1.5— 2.5	Grams	..0.16 —0.17	per cent

Usually a large quantity of solids is shown by the excretion of a urine of high specific gravity, but this alone is not a safe guide; if the quantity of urine excreted in twenty-four hours is very small, the total solids is likely to be reduced; if there is a large amount of urine, even though the specific gravity is low, the excretion of solids may be increased.

The quantity of solids may be computed by the following simple rule: Multiply the two last figures of the specific gravity by 2.33 (Häser's coefficient); this given the number of Grams of solid matter in 1000 Cc. Multiply the result by the number of Cc. of urine passed in twenty-four hours. For instance, if the patient passes 2400 Cc. of urine having a specific gravity of 1030 we get the following: $30 \times 2.33 = 69.90$. This multiplied by 2400 gives 167.76, the number of Grams of solid matter passed in the twenty-four hours.

Organic Constituents of Normal Urine.

Urea. $CO(NH_2)_2$.—This is in many respects the most important constituent of normal urine. It is in this form that most of the nitrogenous waste is excreted from the body. An excess shows either that more proteid food is being taken than the organism can dispose of, or that there is a rapid breaking down of tissue; a reduction in its quantity points to defective metabolism or to its accumulation in the body. Urea is formed in the liver.

The excretion of urea is diminished with (1) an exclusive carbohydrate diet; (2) inanition; (3) diseases of the liver; (4) all forms of Bright's disease. It is increased with (1) a proteid diet; (2) severe exercise; (3) in fevers; (4) diabetes insipidus; (5) diabetes mellitus; (6) chronic gout.

The quantity of urea is most readily determined with Doremus's

ureometer. A solution of sodium hypobromite is used, prepared as follows:

1. A solution is made containing 100 Gm. of sodium hydrate and 250 Cc. of distilled water (6 ounces to the pint.)

2. To 10 Cc. of this solution add 1 Cc. of bromin (1 to 10). Mix thoroughly and dilute with an equal volume of water. The sodium hypobromite solution is now ready for use.

3. The bulb of the ureometer is filled with the solution and the instrument is now inclined until the long arm is filled to the bend. By means of the pipette 1 Cc. of urine is passed through the bend beneath the column of the solution and slowly expelled. Nitrogen gas is evolved from the combination and collects in the upper end of the tube. Two forms of the instrument are made: In one each division indicates one grain of urea in a fluidounce of urine; the other is graduated to the fractions of a gram in a cubic centimeter (from 0.01 to 0.03 Gm.). In the latter the percentage of urea is determined by moving the decimal point two places to the right; that is, if the reading is 0.02, there is 2 per cent of urea. The quantity of urea is determined by multiplying the total quantity of urine passed in twenty-four hours by the reading of the ureometer. For instance, if the patient is passing 1200 Cc. of urine, showing 0.03 Gm. per Cc., the total quantity would equal 1200×0.03, or 36 Gm.

Uric Acid, $C_5N_4H_4O_3$.—This substance was formerly thought to be the product of imperfect nitrogenous metabolism. According to a later view it is derived largely from nuclein. It is probably formed in the liver. It is excreted in the urine as sodium, potassium and ammonium urates, never as free acid. The quantity is increased by (1) meat diet; (2) by insufficient exercise and water; (3) by acute diseases; (4) in anemia; (5) in gout *following the* paroxysm; (6) in diabetes mellitus. It is decreased by (1) a vegetable diet; (2) by the free use of water and exercise; (3) by kidney disease; (4) in gout *preceding* and during attack.

Qualitative Test (Murexid Test).—The presence of uric acid may be determined by evaporating some urine to dryness, adding a drop or two of nitric acid and evaporating again. A drop or two of dilute ammonia is added to the residue. A purple-red color is produced if uric acid is present.

Quantitative Test.—Heintz's method is as follows: The urine should be freed from albumin and filtered. 200 Cc. are mixed with 10 Cc. of HCl and allowed to stand in a cool place for twenty-four hours. The crystals of uric acid are collected on a filter, washed, dried and weighed.

Crystals.—Uric acid crystals may be seen readily under the microscope. They assume a variety of shapes—rhombic, whetstone, wedge, club and diamond shapes and rosettes. They are yellowish

or yellowish-red in color, and constitute the "brick-dust" sediment precipitated from standing urine.

Chlorids.—These are increased (1) after a full meal; (2) by the excessive use of table salts; (3) in diabetes insipidus. They are decreased (1) during febrile conditions, especially those having serous exudates, as pleurisy, acute meningitis, etc.; (2) chronic dropsical conditions; (3) dyspepsia. The chlorids are detected as follows: A few drops of nitric acid are added to the urine in a test tube. Then a little nitrate of silver solution (1 to 8) is added. If chlorids are present in abundance a whitish precipitate is formed which sinks quickly to the bottom of the test tube; if the chlorids are reduced there will be slight, diffusable cloudiness. Absence of precipitate shows absence of chlorids. An accurate method for percentage estimation is found in the use of the centrifuge with graduated tubes, as described by Purdy.

Phosphates found in the urine are of two classes: (1) Earthy phosphates, salts of magnesium and calcium. In ammonical urine "triple phosphates" are formed—ammonio-magnesium phosphates. Earthy phosphates are soluble in acids (hence in acid urine), insoluble in water. (2) Alkaline phosphates, salts of sodium and potassium. These are soluble in water and alkalies. The phosphorus compounds are derived from the food and from the wasting of tissues rich in phosphorus. The phosphates are increased (1) by nervous disorders; (2) by mental work; (3) by diseases of the bones; (4) by acute yellow atrophy of the liver; (5) by pulmonary tuberculosis. They are diminished during (1) pregnancy; (2) acute diseases; (3) most chronic diseases; (4) kidney diseases; (5) before an attack of gout.

Test for Earthy Phosphates.—Alkalinize the urine with ammonium or sodium hydrate and boil. A flocculent precipitate forms which dissolves upon the addition of acetic acid.

Test for Alkaline Phosphates.—Remove the earthy phosphates as just directed. Add to the urine one-third its volume of the following fluid which throws down a snowy precipitate:

Magnesium sulphate	1 part.
Ammonium hydrate	1 part.
Ammonium chlorid	1 part.
Distilled water	8 parts.

Sulphates.—The quantity of sulphates in the urine is generally of minor importance. They are increased during acute febrile diseases, especially those of the brain and spinal cord; decreased in most chronic diseases, especially of the kidney and in carbolic acid poisoning.

Test.—A white precipitate is formed by the addition of a finger-breadth of the following solution to half a test-tube of filtered urine:

Barium chlorid ..... 4 parts.
Hydrochloric acid (C.P.) ..... 1 part.
Distilled water ..... 16 parts.

Carbonates.—The carbonates of sodium, magnesium, calcium and ammonium are derived principally from fruit and vegetables taken as food, and will be found in alkaline urine. Urine containing carbonates soon becomes turbid upon standing. The addition of HCl releases bubbles of CO_2.

Abnormal Constituents of the Urine.

Albumin.—A number of albuminous bodies are now known to appear in the urine. The most important and common of these is *serum-albumin.* Its presence generally signifies some disturbance in function or alteration in the structure of the kidneys. It is found (1) in all forms of Bright's disease; (2) in uremia; (3) in severe acute diseases, as diphtheria and yellow fever; (4) when there is blood or pus in the urine; (5) after severe exercise; (6) after eating much lean meat; (7) in circulatory disturbance causing increased blood pressure.

The presence of albumin in the urine does not necessarily signify that there is disease of the kidneys.

Tests For Serum-Albumin.—1. *Heat And Acid.*—A small quantity of urine is boiled in a test tube. Albumin, if present, forms a white precipitate. Slight cloudiness may be due to the presence of earthy phosphates; this will clear up upon the addition of a few drops of nitric or acetic acid and reboiling. If the cloudiness still persists there is albumin.

2. *Heller's Test.*—A dram or two of pure nitric acid is placed in the bottom of a test tube and an equal quantity of urine added carefully, allowing it to run gently down the side of the tube so that it will overlay the acid without mixing with it. If albumin is present there will be a white zone at the line of contact. The reaction is obscured by the presence of urates which make a yellowish-white ring; they are dissolved by gentle heat. Mucin and resinous acids may also cause a similar reaction.

3. *The Ferrocyanid Test.*—Place half a dram of acetic acid in a test tube, add a dram or a dram and a half of potassium ferrocyanid solution (1 to 20) and mix thoroughly. Now superimpose carefully an equal quantity of urine. If albumin is present a white ring will appear at the line of contact. This is a very delicate test.

Quantitative Test for Albumin.—This test is made with Esbach's albuminometer, using the following reagent:

Picric acid ..... Gm. 10
Citric acid ..... Gm. 20
Distilled water, to make ..... Gm. 1000

The urine is placed in the ureometer to the letter U, then enough reagent added to reach to R. The bottle is now closed with the stopper, thoroughly shaken and allowed to stand for twenty-four

hours, when it may be read. The point to which the precipitate reaches indicates the number of Grams per 1000 Cc. Thus if it is opposite 3, there are three Grams per 1000 Cc, or .3 per cent of albumin. Multiplying the total quantity of urine by the percentage shows the amount of albumin excreted.

Purdy has devised a ready method for the quantitative examination of albumin by the use of the centrifuge.

Serum-Globulin is usually found associated with serum-albumin and has much the same significance. It is very abundant in amyloid kidney. It may be detected by saturating urine, after neutralizing and filtering, with magnesium sulphate. A white precipitate occurs if globulin is present.

Mucin, if present in large quantities, points to a catarrhal condition of the urinary tract. It may be detected by diluting the urine with water and adding an excess of acetic acid, which precipitates the mucin. Serum-albumin should first be removed by heat and filtering.

Albumose is intermediate between proteid and peptone. It is found in osteomalacia, tertiary syphilis, carcinoma, etc. Its significance is not clear.

Peptone is often present in suppurative conditions. It is present in epidemic cerebrospinal meningitis; absent in tubercular meningitis. To detect, the urine is acidulated with acetic acid; saturated with ammonium sulphate, any precipitate filtered out and picric acid added to the filtrate. Peptone precipitates if present.

Sugar.—Grape Sugar or Glucose ($C_6H_{12}O_6+H_2O$) may occur temporarily in the urine during some of the acute infectious diseases, certain diseases of the heart, lungs and brain and after the administration of certain drugs; but if it is a permanent constituent of the urine it indicates the existence of diabetes mellitus.

Tests for Sugar.—1. *Fehling's Test* is made as follows, and prepared in two parts, to be kept in separate bottles, and mixed when needed:

"A."

Copper sulphate	Gm. 34.64
Distilled water, to make	Cc. 500.

"B."

Potassium-sodium tartrate (Rochelle salt)	Gm. 173
Potassium hydrate	Gm. 125
Distilled water, to make	Cc. 500

These two solutions are kept in a cool place and mixed in equal quantity when needed. 10 Cc. of this is reduced by 50 mgm. of sugar. Ogden prefers a solution having just half the strength of the above; he thinks it keeps better and makes a more delicate test. To a dram of the reagent 6 or 8 drops of urine are added and the mixture gently boiled. If sugar is present there will be a reddish or yellowish precipitate.

2. *Haines' Test.*—This is similar to the above but is a single, stable solution and very delicate and accurate. It consists of:

Copper sulphate	gr.	30
Distilled water	oz.	½

Make a solution and add—

Glycerin	oz	½

Mix and add—

Liquor potassæ	oz.	5

This solution is used in the same way as Fehling's. It should not be boiled too long.

3. *Bismuth Test.*—The urine is diluted with an equal quantity of liquor potassæ, some subnitrate of bismuth added, and boiled. Sugar, if present, causes a gray or black precipitate. Albumin obscures the test and must first be removed. Sulphur gives the same reaction.

4. *Phenylhydrazin Test.*—To 50 Cc. of urine add 1 or 2 Gm. of phenlhydrazin hydrochlorid and 2 Gm. of sodium acetate. Heat on a water-bath for one hour. Upon cooling, yellow, needle-like crystals of phenylglucosazone may be detected with the microscope.

Quantitative Tests for Sugar.—1. *Fermentation Test.*—(a) A small lump of compressed yeast is added to urine of ascertained specific gravity. It is then set in a warm place where it will ferment and the CO_2 allowed to escape. At the end of twenty-four hours the specific gravity is taken; the loss of specific gravity indicates the number of grains of sugar in each ounce of urine. For instance, if it decreases from 1.030 to 1.024, there is 6 grains in an ounce. If 100 ounces are passed daily, the sugar excreted would be 600 grains. To obtain the percentage multiply the number of degrees lost by 0.23. (b) Einhorn's saccharometer is used. This contains a long arm (similar to the ureometer) to collect the CO_2 produced by fermentation. The quantity of urine may be read from the scale. If there is more than 1 per cent of sugar the urine must be diluted from one to ten times.

2. *Fehling's solution* may be used. Albumin is removed from the urine. It is then diluted with an equal quantity of water. A given quantity of the reagent is put in a test tube or flask and gently boiled. From a graduated burette the urine is now dropped slowly into the blue solution. When the blue color entirely disappears the amount of urine used should be ascertained. Since 1 Cc. of this is reduced by 5 mgm. of sugar, the quantity of sugar is easily computed. For instance, if it required 1.5 Cc. of *undiluted* urine to reduce 10 Cc. of the reagent, 50 mgm. of sugar were contained in the 1.5 Cc. of urine. This gives 3.33 per cent of sugar.

Acetone, C_3H_6O, is a carbohydrate body—a colorless liquid having a specific gravity of .792—found in the urine and blood of diabetes. It gives the sweet, fruity odor to the breath sometimes noted in these individuals. It is derived from the decomposition of the pro-

teids of the body and those taken in food. It is found in (1) febrile conditions; (2) cancer; (3) starvation; (4) auto-intoxication; (5) diabetes. In the last disease its appearance in considerable quantity points to an advanced stage of the disease and is often a sign of impending danger. The urine should be examined for acetone in all marked cases of diabetes.

Legal's Test.—A test tube is filled about one-fourth full of urine and is made alkaline with sodium or potassium hydrate. A few drops of a solution of sodium nitroprussid is added. The urine becomes red, changing to a purple color on the addition of acetic acid if acetone is present.

Diacetic acid, $C_6H_{10}O_3$, has much the same significance as acetone. In diabetic urine it points toward impending coma.

Von Jaksch's Test.—The urine is boiled and solution of iron perchlorid added, drop by drop. A dark-red color is produced if there is diacetic acid. Phosphates should be filtered out if they precipitate and more of the iron added.

Bile Pigments.—These are found in the urine in all forms of jaundice. They may be detected by *Gmelin's Test.* A drop or two of urine is placed on a porcelain plate and a drop of fuming nitric acid brought into contact with it. A play of colors from green to violet, yellow and red, is observed; green is most constant.

Indican is found when there is decomposition of albuminous substances in the alimentary tract. It may be detected as follows: Shake 20 Cc. of urine with a few drops of sulphuric acid, 5 Cc. of chloroform and 5 Cc. of 10 per cent solution of sodium persulphate. A blue color is formed, which is deep if the quantity of indigo is considerable.

EXAMINATION OF SEDIMENT.

The sediment in the urine should always be examined with the microscope if serious diseases of the urinary organs are suspected.

Epithelium.—Epithelial cells may be derived from the mucous membrane of the urethra, bladder, ureter, pelvis of the kidney or from the uriniferous tubules. In women, they may also come from the vagina. These cells vary in size and appearance, but their differentiation is often difficult and it is not safe to depend upon it to localize the seat of disease. If the cells are present in large quantity it indicates inflammation, usually of the bladder.

Red Blood-Cells.—These indicate hemorrhage, but they may be so few in number that the urine is not colored. Intimate mixture with the urine and a washed-out color point to involvement of the kidney, the pelvis or ureter; if they are not intimately mixed and are bright in color, the seat of the trouble is probably the bladder or urethra.

Pus and Leukocytes.—An abundance of these indicates disease of the genito-urinary tract. The pus-corpuscles are round, granular and contain several nuclei, which are often indistinct, but may be seen easily if a little dilute acetic acid is added to the fluid. The pus in urine makes a cloudy sediment, which settles at the bottom of the vessel. If the urine is alkaline the cells are destroyed and converted into a ropy, gelatinous mass if shaken up with an alkali.

Liquor potassæ may be used in this test (Donne's test). The clear urine is poured off, the alkali added to the sediment and violently agitated.

Casts.—Casts are small cylindrical molds of the uriniferous tubules of the kidney, varying in size according as they come from small or large tubules. They are caused by coagulation of elements in the blood which reach the tubules by transudation; degenerated fragments of the tubular epithelium may become entangled and cause modifications in their character and appearance. The following are the common varieties: (1) *Hyaline casts* are clear, often transparent, bodies, and are sometimes seen with difficulty. They are found in all forms of kidney disease. Subvarieties are: (a) *fibrinous casts*, common in acute kidney diseases and (b) *waxy casts*, which occur in advanced stages of chronic nephritis and especially in amyloid kidney. (2) *Granular casts* contain a number of granules, derived from broken-down epithelium and implanted in hyaline substance. They are common in chronic kidney diseases. (3) *Epithelial casts* have renal epithelium imbedded in them. Acute diseases of the kidney, which cause exfoliation of the epithelium, are usually responsible for their presence. (4) *Blood casts* are present in hematuria; (5) *Fatty casts* in fatty degeneration, and *Pus casts* in abscess or tuberculosis of the kidney. *False casts*—long, ribbon-like, structureless, mucin bands—are sometimes seen and must not be confused with true casts.

Crystalline Substances.—These include not only the urates, uric acid and phosphates, which have been described, but also oxalate of lime (found in oxaluria), bilirubin, hematoidin, leucin, tyrosin, cholesterin, xanthin, etc. A verbal description is hardly sufficient to identify them. They are best shown by illustration.

Bacteria are often important elements in the urine. They are described in another place.

EXAMINATION OF THE STOMACH CONTENTS.

In order to obtain reliable information concerning the character of the gastric secretions, and especially concerning the quantity of hydrochloric acid, a test meal should be given. After digestion is well advanced, the contents of the stomach are withdrawn with the stomach-tube and examined.

The stomach-tube is a large soft rubber catheter about 30

inches long, with a terminal and two lateral openings at its lower end. The patient sits or stands in a natural position, with the head inclined slightly forward. The tube is held like a pen and pushed backward until it reaches the pharynx; the patient is then directed to swallow, when it is rapidly but gently slid down the esophagus into the stomach. The whole process should occupy but a few seconds. At the first introduction it is likely to excite considerable gagging and retching, but the patient soon becomes accustomed to it and will use it himself with perfect facility.

The tube should not be used if there is uncompensated heart-disease, aortic aneurism, recent hemorrhage, emphysema, or ulcer or cancer of the stomach.

Test Meals.

Test Breakfast of Ewald and Boas.—This is usually given in the morning on an empty stomach. It is the simplest of test meals and the most used. It consists of a dry roll or wheat-bread (35 to 70 Gm.) and water, or weak tea, without sugar and cream (300 to 400 Cc.). The contents of the stomach should be withdrawn in an hour and examined.

The Leube-Riegel test-meal is slightly more stimulating than the above. It consists of soup (400 Cc.), beefsteak, potatoes and wheat-bread. The contents of the stomach are withdrawn in three or four hours.

The two preceding meals are used principally to determine the quantity of HCl. In testing for lactic acid, the *Boas meal* is given, consisting of oatmeal gruel, viz.: one tablespoonful rolled oats and one liter of water, slightly salted and boiled down to 500 Cc.

Gastric Acidity.

The acidity of the gastric juice under normal conditions is due almost entirely to hydrochloric acid. The percentage of this acid usually varies from .15 to .25 per cent. Lactic acid, acid salts and acids of fermentation (acetic, butyric, etc.) are also sometimes found.

Test for Free Acids.—Congo-red in solution or on filter paper is used. In the presence of free acids it turns blue.

Tests for Free HCl.—(1) *Dimethyl-amido-azo-benzol Test (Töpfer's Test.)*—This is the most delicate test. A .5 per cent alcoholic solution of the drug is used. Two or three drops are added to the gastric contents, which need not be filtered. If free HCl is present, a bright cherry-red color develops.

(2) *Phloroglucin-vanillin Test (Gunzberg's Test).*—A solution is used consisting of 2 Gm. phloroglucin, 1 Gm. vanillin and 100 Gm. alcohol (80 per cent). A few drops of the reagent and an equal quantity of the gastric juice are heated gently (below the boiling

point) on a white porcelain plate. If HCl is present a rose-red will develop.

(3). *The Resorcin Test (Boas' Test).*—The reagent consists of 5 Gm. resorcin, 3 Gm. grape sugar, and 100 Gm. alcohol. It is more stable than Gunzberg's test and equally delicate. Six drops of filtered gastric juice and three drops of the resorcin solution are evaporated *gently*, on a porcelain plate. It gives a rose-red or vermilion-red, which fades on cooling.

Total Acidity—Quantitative Estimation.

In making tests to determine the quantity of acid in the gastric juice and estimate correctly the amount of free HCl as compared with the entire acid strength, three tests are required: (1) One to show the amount of free HCl; (2) one to show the amount of organic acids and acid salts; (3) one to show the total quantity of acids, free and combined.

To determine these facts it is necessary to use solutions of known strengths. The *normal solution* is made the basis of our estimation. This is a solution containing as many Grams of the chemical to the liter as equals the sum of its atomic weights, providing it is monobasic. A dibasic chemical would require only one-half as many Grams, etc. For instance: The atomic weights of HCl are $1+35.5$, or 36.5. Therefore a normal solution of HCl contains 36.5 Grams to the Liter of distilled water. Another instance: The atomic weights of NaOH (sodium hydrate) are $23+16+1=40$. Therefore it contains 40 Grams to the Liter of water. For practical purposes *decinormal solutions*, one-tenth this strength, are used; thus, 4 Grams of NaOH to the Liter.

Now, in testing for the acidity, a decinormal alkaline solution (usually the NaOH) is added drop by drop from a graduated burette to 10 Cc. of the filtered gastric juice, to which an *indicator* has been added which shows by change of color when sufficient of the reagent has been added. There are three of these indicators:

(1) A .5 per cent alcoholic dimethyl-amido-azo-benzol solution (also used for qualitative tests). Two or three drops of this turns the gastric filtrate a bright red. This color fades after shaking when enough decinormal NaOH solution has been added to neutralize the free HCl. *It therefore shows the quantity of free HCl.*

(2) A 1 per cent aqueous solution of alizarin. A few drops are added to the 10 Cc. of filtered gastric contents. It turns a clear violet when sufficient NaOH solution is added. Some practice is necessary, and Töpfer therefore recommends that preliminary tests be made with distilled water, 1 per cent disodium phosphate, and 1 per cent sodium carbonate, in order to recognize the correct shade. *This test shows, in addition to the quantity of free acids, the acid salts and organic acids.* By subtracting the quantity of free acid obtained by (1) the amount of organic acids and acid salts is learned.

(3) A 1 per cent alcoholic solution of phenolph-thalein is used. Two or three drops are added to the filtered gastric contents. When the NaOH solution is added a red color is produced; when this no longer disappears on shaking the acidity is neutralized. *This test shows the total quantity of acids, free and combined.* The combined acids may be learned by subtracting from the result the quantity obtained by the alizarin test (2).

The total acidity after the Ewald-Boas meal is, on an average, about 60. This means that it takes 60 parts of the decinormal NaOH solution to neutralize completely 100 parts of the gastric filtrate,—or 6 Cc. of the reagent to 10 Cc. of the filtrate, the quantity usually used in making the test. If it is desired to express this in percentages the result (60 in this instance) is multiplied by .00365, the quantity (in Grams) of HCl in one Cc. of the corresponding acid solution. This gives .219 as the percentage of HCl. The quantity of free acid, acid salts, etc., is learned in the same way, with tests (1) and (2).

Lactic Acid.

Lactic acid is found in excess in cancer of the stomach. In order to exclude any which may be contained in or derived from the food the oatmeal-gruel test meal should be given, the contents of the stomach being withdrawn in an hour.

Uffelmann's Test.—The solution used consists of a drop or two of a strong ferric chlorid in 10 Cc. of a 1 per cent solution of carbolic acid. A violet-colored liquid is formed, which becomes lemon-yellow in the presence of lactic acid. Since the test is obscured by the presence of large quantities of HCl, glucose, acid phosphates, butyric acid and alcohol, the lactic acid should be extracted with ether, the etherial extract evaporated and a test made with an aqueous solution of the residue.

Other Acids.

Acetic acid may often be recognized by its odor. An ethereal extract is made and after evaporation the residue is dissolved in a little water and carefully neutralized with a solution of caustic soda. A dilute solution of ferric chlorid gives a dark-red color if acetic acid is present.

Butyric acid may also be recognized by its odor—that of rancid butter. An ethereal extract may be made and the residue dissolved in water, as directed for lactic and acetic acids. If a little calcium chlorid is added, oil-droplets of butyric acid separate out.

Digestive Ferments.

Pepsin and Pepsinogen.—The simplest way to test proteid digestion is to place a small piece of coagulated egg-albumin (boiled white of egg) in a given quantity of the gastric filtrate, in an incubator at 100° F. It should be digested in three hours. A valuable

comparative test consists of placing equal quantities of the gastric filtrate in three test-tubes. A little hard-boiled white of egg is put in each. To the first test-tube nothing further is added; to the second, enough HCl is added to bring the acidity up to .2 or .3 per cent; to the third, the hydrochloric acid is added and also a little pepsin (.2 to .5 Gm.). The rapidity with which digestion is completed in the three tubes, when placed in the incubator at 100° F., shows whether the ferments are in sufficient quantity. If the egg in all three tubes is digested, it shows that both pepsin and pepsinogen are present; if it is digested in only two and three, it shows that pepsinogen is present and pepsin deficient; if only number three is digested, then both pepsin and pepsinogen are absent.

Rennin.—To learn if rennin is present, carefully neutralize the gastric filtrate with NaOH solution and add an equal quantity of neutral milk. Shake well and place in the incubator at 100° F. If rennin is present, the milk will coagulate in 15 or 20 mnutes.

Products of Digestion.

Peptone and propeptone are products of proteid digestion, and are detected with the biuret test. The filtrate is alkalinized with KOH solution and a dilute copper sulphate solution added. This gives a bright-red color with propeptone and peptone; it is blue if albumin is present.

Carbohydrates.—The completeness of starch digestion may be learned with Lugol's solution, with which it gives a blue color. With maltose and dextrose there is no reaction.

Other Tests.

Motility of the Stomach.—This may usually be ascertained by the physical methods of diagnosis—the detection of the "splashing" sound some time after eating. The *salol test* depends upon the fact that this drug is not absorbed from the stomach. It appears in the urine as salicyluric acid 45 minutes to one hour after taking. One Gram is administered. The urine gives a violet color with 10 per cent ferric chlorid solution.

Absorption from the Stomach.—Potassium iodid is administered. This should appear in the saliva as free iodin in 10 to 15 minutes. It is tested with starch and fuming nitric acid.

Mucus.—This is readily detected by inspection as a glossy, stringy substance. An excess points to a catarrhal condition of the stomach.

Bile.—When found in considerable quantity, this may be due to duodenal stenosis. See examination of the urine for test.

Blood may be due to gastric ulcer or cancer, erosions, swallowing of blood from bronchial hemorrhages, and hemorrhagic diseases. It makes a dark, grumous, coffee-colored mass when partially digested; fresh blood is bright-colored.

Bacteria.—These are frequently found, even when digestion is apparently perfect. The Boas-Oppler bacillus is an almost constant accompaniment of carcinoma of the stomach. They are supposed to be concerned in the formation of lactic acid. *Sarcinae*, on the other hand, are found in fermentative conditions, but are practically always absent in carcinoma.

Mucous Fragments.—An examination of these under the microscope often gives valuable information as to the state of the gastric mucosa.

BACTERIOLOGICAL DIAGNOSIS.

Bacteria and Their Relation to Disease.

There is a popular notion that bacteria or microbes belong to the animal kingdom and are a small kind of "bugs." The truth is that they are vegetable organisms belonging to the simplest division of plant life and consisting each of a single cell. So minute are some of them that they are barely recognizable with the most powerful microscopes. They multiply with the greatest rapidity, a few hours being sufficient to produce thousands and millions of progeny. Nor are they entirely inimical to the welfare of man. They are concerned in many of the beneficent works of nature, as in the transformation of the nitrogen of the air into plant growth, the fertilization of soils and the production and preparation of certain forms of food.

Distribution.—Bacteria are found practically everywhere; they are in all waters, flowing or stagnant, unless previously sterilized; in all liquids that ferment or spoil; in the soil of the field or the dust of the street; they float in the air; and are in all moist vegetable or animal tissues. As a consequence we take thousands of them into the stomach with our food and drink, and breathe them into and out of the lungs. But, unless they find a suitable soil for growth or a feeble and unresisting organ, they can do no harm.

Classification.—According to form bacteria are divided into four groups: (1) The round or ovoid or *micrococcus;* (2) the rod, or *bacillus;* (3) the corkscrew or spiral form, or *spirillum;* (4) the filamentous form. Nearly all the disease producing bacteria belong to the two first. Among the micrococci may be mentioned the following: The *streptococcus* and *staphylococcus*, or pus microbes, which produce inflammation in wounds, boils, abscesses and blood poisoning; the *pneumococcus*, which causes pneumonia; and the *gonococcus*, which causes gonorrhoea. Among the bacilli are the following: The *bacillus tuberculosis*, the cause of consumption; the *bacillus tetanus*, which causes lockjaw; and the *bacillus diphtheriae*, the cause of diphtheria. It is now believed that nearly or quite every inflammatory disease has its specific microbe, as a cause.

Conditions of Life.—In order that bacteria shall grow and reproduce rapidly they must have a favorable soil for growth and suitable nutriment. Some of them only grow in the presence of air, some only when it is absent. A warm moist temperature suits them best; cold usually checks their growth, but does not destroy them; extreme heat kills all forms, and boiling a few minutes is universally fatal. Sunshine is inimical to all bacteria, hence it is "a great purifier." Dirt, dust and filth invite their presence and provide soil for their rapid increase.

How They Produce Disease.—(1) *By their influence on food.* Many of the everyday household happenings are caused by bacteria. They make the milk sour, the butter rancid, the bread to spoil; they change alcohol into vinegar and make the meat putrid. These influences may extend to the digestive tract and cause fermentation of the food; in the bowel putrefactive changes may result from their presence. Most of the stomach and bowel troubles of summer come from the changing or tainting of food by bacteria.

(2) *By the poisons which they produce.* By the action of the putrefactive bacteria on decomposing food, powerful alkaloidal poisons, called *ptomains*, are formed in the bowel. They are rapidly absorbed and carried throughout the body. In a concentrated form they are as dangerous as strychnin or arsenic. The sickness and death that occasionally result from eating tainted fish, various canned meats, ice cream, milk and other articles of food, are due to ptomain poisoning.

Most frequently disease is caused by the poisons which the bacteria themselves produce—the excretion or waste from their own cellular bodies. These poisons are called *toxins* and when taken into the blood produce immediate systemic disturbance; fever is produced and the characteristic symptoms of the disease of which they are the cause. Good examples of this form of action are seen in diphtheria and typhoid fever. In one case the throat, in the other the small intestine is the place where the microbes make their home, grow and multiply. The toxins they produce are carried all over the body and make the disease a general one.

(3) *By their local action.* Often, perhaps usually, bacteria cause direct irritation by their presence and local inflammation is a result. But even in these cases there is more or less constitutional disturbance from the absorption of poisonous bacterial excretions. An example is seen in consumption where the *bacillus tuberculosis* is the focus for the formation of tubercles, with inflammation, abscess and the consequent destruction of the lung.

Nature's Method of Fighting Disease.—When microbes find their way into the blood or tissues nature provides means for their destruction. The leukocytes or white corpuscles of the blood gather at the infected point and wage battle with the invaders, destroying

them and hedging them in with a congested and inflammatory zone if possible.

In the acute, self-limited diseases, it is now believed that a result of this warfare is the production in the blood of a natural antidote or *antitoxin* which neutralizes the specific poison of the invading bacteria. Practical use is made of this fact in the treatment of diphtheria. The *toxin* peculiar to the disease, made by growing the diphtheria bacilli in test tubes and straining out the poison, is injected into a healthy horse in increasing doses till the extent of tolerance is reached. Some of the horse's blood is now drawn off and the clear serum separated. This now contains *antitoxin* and is injected into the body of the patient as a cure for diphtheria. The same principle is used in the treatment of other diseases.

Immunity against second attacks of the contagious diseases is probably obtained in a similar way, viz., there is produced a permanent alteration in the character of the blood, or an antitoxin, during the course of the disease, which makes it inimical to the future growth and development of the causative bacterium.

Asepsis and Antisepsis.—It is evident that it would greatly simplify the problem of health and disease if we could avoid all bacteria or even destroy them readily. Sanitation and hygiene aim to do this as far as possible, and the abolition of dirt and filth helps to abolish disease because it destroys the soil in which microbes live and multiply.

In surgery we *must* keep them out of the wound and destroy them if present. To keep a part free from microbes is *asepsis;* to destroy them, *antisepsis.* The prime necessity is that the wound and everything that comes in contact with it shall be absolutely clean, not only to the eye, but absolutely free from inflammatory germs—and kept so. This is attained by thorough washing, the application of germicides or antiseptics, and the use of the surgical dressing as a protective.

It is not so easy to reach the microbes when they have entered the body. The antiseptics, as a rule, cannot be taken in sufficient quantity to destroy them or greatly affect their growth. We are learning something now of nature's method of combating disease, and as we know and understand her better there is reason to believe that we shall find the secrets of mastery.

Preparation of Microscopic Slides.

Before entering on the discussion as to the differentiation of the various forms of bacteria causing disease, it may be well to describe briefly the method of preparing a slide for microscopical examinations.

The slide and cover glass are carefully cleaned with alcohol, so as to free them from grease and oily substances, and then rinsed

in sterile water and dried with a clean piece of cheese cloth. The material which is to be examined is then spread very thinly on the slide or cover glass with a platinum inoculating needle, which has been first sterilized in the flame of an alcohol lamp or Bunsen burner. This is allowed to dry *in the air* and is then fixed to the slide by passing it slowly through the flame of an alcohol lamp or Bunsen burner at least three times. You are then ready to stain. The most serviceable and satisfactory stains for bacteria are gentian-violet and methylene-blue. As these stains can be purchased ready for use at any chemical or instrument house for a merely nominal sum, it is hardly necessary for the amateur bacteriologist to burden his mind with the preparation of these stains. In addition to the two mentioned it is necessary to have some carbol-fuchsin for staining tubercle bacilli, and Gram's solution for differentiating the gonococcus.

Several drops of the stain are now placed on the smeared surface by means of a medicine dropper, or pipette, and allowed to remain for a few minutes. It is then thoroughly washed in water, carefully dried between filter-paper and mounted in Canada balsam. The specimen is now ready for examination. Any good microscope can be used, and some of the bacteria can be seen with a 1-7 objective, but in order to do satisfactory work it is necessary to have a 1-12 oil immersion lens. The characteristics of the bacteria are then easily distinguished.

Special methods of staining are used to bring out the spores, flagellæ and capsules of germs, but the infrequency of the necessity for their use, except in scientific bacteriological work, makes it unnecessary to dwell on them in this connection.

Chief among the numerous disease-producing bacteria are the so-called pus germs, or the bacteria of suppuration. These are the pyogenic cocci—staphylococcus, streptococcus, pneumococcus, gonococcus and meningococcus—the pneumonia bacillus or bacillus of Friedlaender and the bacillus pyocyaneus.

Staphylococcus Pyogenes.

These germs are spherical in shape and are arranged in the form of bunches of grapes—whence their name. They stain readily with all basic anilin dyes. There are several varieties of these cocci—the golden, citron, white, waxy white and waxy yellow. The golden coccus, or staphylococcus pyogenes aureus, is by far the most virulent of these cocci, the white, or albus, the least so. The color characteristics can only be brought out in cultures. Under the microscope they all have the same appearance. The staphylococci are the cause of all circumscribed suppurations.

Streptococcus Pyogenes.

These cocci are much more virulent than the staphylococci. They are the cause of all spreading suppurations, especially erysipelas

This disease was the first in which the streptococci were found, and they were named by their discoverer the streptococcus erysipelatus of Fehleisen. This distinction has been abandoned, all the streptococci being placed under the one head of streptococcus pyogenes. Like the staphylococci they are spherical in form, but differ from these in their arrangement. They are always seen hanging together in long chains, which are termed streptococcus brevis and longus, according to their length. They stain readily with the basic anilin dyes, such as methylene-blue or gentian-violet. They are usually seen in tubercular sputum.

Pneumococcus.

This germ is also known as the diplococcus pneumoniæ of Fraenkel and micrococcus lanceolatus, because of its shape and arrangement. It is a coccus having a lance-shaped end and always seen in pairs. The points are toward each other. They are surrounded by a capsule. They do not form groups, but are occasionally seen in chains, in which the pair arrangement is not lost, however. They stain readily with the aniline dyes and also by Gram's method (see Gonococcus). The pneumococcus is the cause of lobar pneumonia.

Bacillus of Friedlaender.

This bacillus, or pneumobacillus, is a rod-shaped organism arranged in pairs and in chains. It also has a capsule. It stains readily with the aniline dyes, but not with Gram's method, in that respect differing from the pneumococcus. It is found in some cases of lobar pneumonia.

Bacillus Pyocyaneus.

This is the bacillus of green or blue pus. It is a small, slender rod, exceedingly motile, sometimes arranged in short chains, but usually lying singly. It does not stain with Gram's method, but quite readily with the aniline dyes.

Meningococcus.

A number of bacteria cause meningitis, amongst them the pneumococcus, pneumobacillus, staphylococci and streptococci, but the specific germ is the meningococcus, or diplococcus intracellularis meningitidis of Weichselbaum. It is a crescent-shaped organism, arranged in pairs (like the pneumococcus) and usually contained within the cells like the gonococcus. It does not, however, stain with Gram's method. It is stained readily with methylene-blue. The cultural characteristics are entirely different from the pneumococcus, thus differentiating it. The source of derivation is the essential point in the diagnosis.

Gonococcus.

The gonococcus of Neisser, the causative germ of gonorrhea, has the appearance of a coccus split in two equal parts. They resemble a biscuit and are occasionally designated as the biscuit-coccus, or semmelkokken. The contiguous sides are flat. They stain readily with the anilin dyes, but not with Gram's stain. They are always present in the secretions of all gonorrheal inflammations and their position in the pus cells, in the immediate neighborhood of the nucleus, is absolutely characteristic.

Gram's method of staining is as follows: The prepared slide or cover glass is placed in anilin-water gentian-violet solution for a few minutes, and for two or three minutes in a compound iodin or Lugol's solution. It is then decolorized in alcohol, allowing it to remain in the alcohol as long as any color is given off. It is then well washed in water, dried and mounted in Canada balsam. Those bacteria that are stained assume a bluish-black color, while those that are not have a very light-gray, or almost colorless appearance. The solutions necessary for this method can be purchased made up. The characteristic reactions will not result unless the method is very accurately followed out.

Tuberculosis.

All tubercular processes are due to the tubercle-bacillus. This bacterium is a very delicate, slender rod of moderate length and slightly curved. They usually lie singly, but occasionally form short chains. They may at times look slightly club-shaped or segmented or bifurcated, suggesting a relationship between tubercle and actinomyces. Their principal and diagnostic characteristic is their reaction to stains. They stain with extreme difficulty and not at all with the ordinary anilin dyes. Having once taken up the stain they retain it with great tenacity.

The method usually used is that of *Ziehl-Nielsen or the carbol-fuchsin method.* The method is as follows:

One of the small yellow nodules contained in tubercular material is spread thinly and evenly on a clean slide, or it is placed between two cover glasses, which are then slid apart, leaving a very thin film on each cover glass. These are then dried in the air and fixed by passing through a flame as previously described. The cover glass is then placed in a watch crystal containing carbol-fuchsin and slowly heated for from five to ten minutes. The excess of stain is now washed off with water and the specimen placed in a 33 per cent. solution of nitric acid. This completely decolorizes everything with the exception of the tubercle bacillus. The acid is washed off in 60 per cent. alcohol. The specimen is now ready for examination. The tubercle bacilli are stained red. For purposes of better differentiation of the bacilli the specimen, after having been washed in 60 per cent alcohol, is washed in water and stained

with methylene-blue. This shows up much more clearly the red color of the tubercle bacillus, all the other germs and fluids being stained blue.

Another method of staining is the cold method. The procedure is the same as the above, with the exception that no heat is used for staining. The specimen is allowed to remain in the carbol-fuchsin solution for twenty-four hours and then mounted as already described. This is not only a slow method, but less satisfactory than the staining with heat. Care must be taken to stain sufficiently and to decolorize well. When no more color is to be seen on the specimen, or, at most, only a very faint, brownish-yellow, it has been sufficiently decolorized. The specimens are mounted in the usual manner.

The tubercle bacillus is found in all tubercular tissue and its products, and is usually associated with streptococci and staphylococci.

Leprosy.

The bacillus of leprosy, or Hansen's bacillus, very closely resembles the tubercle bacillus. They are usually found in the tissue-cells, and have also been found in the blood, but only during the febrile periods. The organism stains readily with the method used for staining tubercle bacilli, and also, unlike the tubercle bacillus, with the aniline dyes, especially gentian-violet. Gram's method is also applicable. They have neither a characteristic arrangement, other than their location in the so-called "leprosy cells," and are not spore bearing.

Bacillus Typhosus.

The bacillus of typhoid fever, also known as the bacillus of Eberth, is a very short, thick rod having distinctly rounded ends. When examined in a hanging drop they are seen to be exceedingly motile, a snake-like movement. This is due to the flagellæ, or tails, of which the organism has from ten to eighteen. The bacillus has no definite arrangement, usually lying singly. Occasionally we see a bright, unstained spot in one or the other end of the bacillus, resembling a spore. It is not a spore, however, but merely an involution form of the organism. The bacillus typhosus stains very slowly and very poorly. It is necessary to heat the stain a trifle while on the slide, or drop the cover glass containing the smear into a watch crystal. Drop on the stain and place the watch crystal over the flame for a few minutes, adding a little of the stain from time to time so as not to allow it to evaporate. Wash off the stain and finish the mount in the ordinary way. Gram's method is not applicable.

The bacillus typhosus is almost identical in appearance with the bacillus coli communis, or common colon bacillus. By cultivating the germ in question the differentiation is easily made. The typhoid

bacillus does not coagulate milk; is not acid producing; does not produce fermentation nor indol, all these properties being characteristic of the colon bacillus. The fact that the typhoid bacillus is found in the course of a typhoid fever and the application of the Widal agglutination test are, of course, essential aids in diagnosis. The organisms are found in infected water, soil and in the feces, urine, rose-colored spots and spleen of typhoid cases.

Diphtheria.

The bacillus diphtheria, or Klebs-Loeffler bacillus, is marked by its extreme variability in both appearance and arrangement, especially in cultures. When examined in the membrane taken from a case of diphtheria it usually appears as a long, slender rod, slightly curved, exhibiting a tendency to point or club at the extremities. One extremity may be pointed and the other clubbed, or both ends may be clubbed, giving it a dumb-bell appearance. Sometimes the organism is seen to bifurcate like a streptothrix. At other times it is seen as a rather plump rod of varying size. It is non-motile and has no spores. It stains very nicely with methylene-blue and with Gram's method. The small, blunt clubs stain equally, but the larger organisms exhibit unstained areas, giving the rod a segmented or pieced appearance. When counterstained with vesuvin, the organism is stained a deep brown, and in each end is a large, bright-blue granule, and sometimes a third in the middle of the germ, known as the Babes-Ernst bodies. These are only seen in cultures from nine to twenty hours old. Another characteristic of the diphtheria bacillus is its arrangement in pairs, like matches laid side by side.

The bacterium is found in the upper strata of all diphtheria membranes in any part of the body, and occasionally in the mouths of healthy individuals. This is the case only when the individual has come in contact with a case of diphtheria and the bacilli did not develop because of unfavorable conditions.

Tetanus.

The bacillus of tetanus, or bacillus of Nicolaier, is a long, slender rod, with rounded extremities, in one of which is a large bulbous body, the spore, giving the organism a characteristic drum-stick shape. It presents no definite arrangement. It stains very readily with any of the aniline dyes and also by Gram's method. It is found in dust, garden soil, animal excrement, intestinal tract of cattle and in the pus of wounds infected with tetanus.

Plague.

The plague bacillus is a small, non-motile rod, with rounded extremities. Like the diphtheria bacillus, they are extremely variable in shape. They may resemble a diplococcus, a distinct bacillus, a

vibrio, or be club-shaped. They have no definite arrangement and are not spore-bearing. It stains best with methylene-blue. Gram's method is not applicable. Occasionally the extremities stain more heavily than the middle portion, thus suggesting spore formation. It is, however, merely a staining peculiarity. The bacterium is found in infected rats, the glands of infected persons and in the sputum of cases of plague-pneumonia.

Cholera.

The exciting cause of cholera is the cholera bacillus, or Koch's comma-bacillus, or spirillum choleræ, or S bacillus. It is a short, thick, slightly bent rod, resembling a comma. They are frequently arranged in pairs or chains of two, and when their curves are opposed they bear a strong resemblance to the letter "S." Sometimes the organism is perfectly straight. This is especially true when the mount is made directly from the infected case. The long forms, the spirillæ, are seen only in old cultures or cultures to which an antiseptic has been added. They contain no spores. The bacillus stains best with carbol-fuchsin. They do not stain with Gram's method. They are found in the dejecta of cholera patients and in infected water.

Influenza.

The influenza bacillus, or bacillus of Pfeiffer, is a very small organism, about two or three times as long as wide. It has rounded ends, no capsule, no spores and no definite arrangement. Sometimes two germs lie close together, when they may resemble a diplococcus. It stains very poorly, and not at all by Gram's method. A very dilute solution of carbol-fuchsin is best. It must remain in the stain for from five to ten minutes, at least. It can be obtained from influenza throats or from the bronchial mucus, or fluid from a broncho-pneumonia of influenzal origin; in short, the secretions of influenza patients. They are, as a rule, not found in the blood.

Malignant Edema.

The bacillus of malignant edema, or vibrion septique of Pasteur, is of about the same length as the anthrax bacillus, but considerably thinner, with rounded ends. It is extremely motile. Its most marked characteristic is its arrangement in very long chains or filaments resembling a thread laid on the slide. It has a spore which is wider than the bacillus and usually centrally situated, giving the organism a spindle-shaped appearance. It stains easily with all the anilin dyes, but not with Gram's method.

Syphilis.

Many different varieties and species of bacteria have been found in syphilitic lesions, but, as yet, none have been accepted as the

specific cause of this disease. The bacillus of Lustgarten is the only one worthy of mention. He found the organism in the lesions and discharges of syphilis. They require a special, lengthy method of staining and are not easily demonstrated. They resemble, in a measure, the tubercle and leprosy bacilli. They are usually seen in groups of from two to nine, lying within the lymphoid cells. They are long, not very thick, straight or slightly bent rods, the surface presenting a wavy contour. The bacillus does not resist the action of hydrochloric and nitric acids like the tubercle bacillus. Many believe the smegma bacillus to be identical with the bacillus of Lustgarten. Sufficient evidence has, as yet, not been adduced to substantiate Lustgarten's claims.

Actinomycosis.

The causative factor of this condition is the actinomyces or ray-fungus, an organism belonging to the botanical subdivision, hyphomycetes, or moulds. It is also classed as a streptothrix. It is found in the lumpy-jaw of cattle and in the lesions in man. It is also supposed to be the exciting cause of Madura foot. It presents itself to the naked eye in the form of a small yellow granule embedded in the affected tissue. When stained with Gram's method, Weigert's fibrin stain or picro-carmin, the fungus-mass is seen to consist of several distinct zones. The center is occupied by a granular mass, sometimes containing bodies resembling cocci or spores. Radiating from this central mass and extending into the tissues is a zone of branched, thickly-tangled mycelial threads, each terminating in a free, club-shaped extremity. This gives the fungus a rosette-like appearance.

Blastomycosis.

An affection of the skin caused by the blastomyces, a pathogenic yeast. Stained sections are always found to contain the characteristic organism which resembles the ordinary yeast in appearance. It stains best with fuchsin.

DRUGS AND THEIR ADMINISTRATION.

So much of the physician's success depends upon the intelligence and skill with which he administers his medicines that he cannot afford to remain in ignorance of this branch of his profession. And yet, many otherwise able men affect to despise it. This position is manifestly an ignorant and injudicious one. No matter how accurate a diagnostician he may be, careless prescribing may prove his undoing. It is important that he should know not only what drug is the indicated one in each case, but the best method of administering it, the proper dose, whether its effect can be heightened by combination with other drugs, and last, but by no means least,

how to prescribe it in a palatable or fairly acceptable form. The nauseous mixtures which our fathers and grandfathers swallowed uncomplainingly the present generation refuses to take—nor is it often necessary that they should.

Route of Administration.—Remedies may be prescribed for local or general use. In the first case they are applied directly to the part to be affected, i. e., the skin, the mucous membrane of the eye, ear, nose, throat, bronchi, urethra, vagina or rectum. In the second case they are intended for absorption into the body, though drugs may be taken into the stomach for their direct effect upon some part of the alimentary tract.

Medicines may be introduced into the body for their systemic effect (1) by the mouth, (2) subcutaneously with the hypodermic needle, (3) by intravenous injection, (4) by inhalation, (5) by the rectum, (6) by inunction, (7) by fumigation, (8) by cataphoresis.

Form of Administration.—The numerous Galenical preparations, official and unofficial, used in medicine are described in works on materia medica and need not be enumerated here. It is, however, often a matter of great importance which form is selected.

The following may be given: (1) For internal use it is usually preferable to give medicinal agents in the liquid form, soluble in water, providing a palatable mixture can be made. In this form they are more readily absorbed and are likely to prove less irritant to the stomach. For instance, quinin sulphate and sodium salicylate are best given in solution. (2) Drugs and medicinal substances soluble in alcohol. Among these are oily, resinous, alkaloidal and similar extractive substances, which are precipitated upon the addition of an excess of water. Mixtures containing them, therefore, should not be largely diluted with water before taking. A convenient and unobjectionable method is to direct such preparations to be given in milk. As an example, tincture of guaiac is usually taken in milk. The resins may also be given in emulsion.

(3) If it is desired to give oils or oleo-resins in a liquid mixture, they may be made into emulsions. If the taste is disageeable and the dose is not large, a convenient method of dispensing them is in soft gelatin capsules. (4) Some drugs which are soluble neither in water nor dilute alcohol are soluble in oil. Such are salol and salicylic acid. These may be rubbed up with oil and then emulsionized in the usual way. (5) Other insoluble substances are sometimes given suspended in a saccharine or mucilaginous vehicle or glycerin. A common example is chalk mixture.

The solid preparations include powders, capsules, pills, tablets, tablet triturates and troches. The troches or lozenges are especially adapted to use in the mouth and throat; powders, capsules and tablet triturates in the stomach; pills and compressed tablets in the intestine. As a rule, pills and compressed tablets should not be

given when rapidity of action is desired; very insoluble substances, as quinin, salol, phenacetin, etc., should never be given in the compressed tablet or pill form, since they disintegrate slowly and may pass the entire length of the alimentary tract untouched. Volatile substances, fluid extracts, tinctures, etc., should be prescribed in liquid form, if necessary with a flavored vehicle to disguise the taste, since they quickly deteriorate in the tablet form.

Volatile substances may be inhaled directly (as ether or chloroform) or may be conveyed to the respiratory tract by a fine watery spray or vapor (steam) or dissolved in an oily liquid.

Medicinal agents introduced into the rectum are usually given in the form of suppositories, with cacao butter; less frequently they are given in solution as an injection.

Medicine is introduced through the skin mainly by inunction with ointments or rubbing the skin with alcoholic or oily solutions (liniments). It has been shown that watery solutions of non-volatile substances are not absorbed by the unbroken skin.

Fumigation is still occasionally used in syphilis and is practically confined to the treatment of this disease. Mercury is volatilized by heat, under cover, and is deposited in minute subdivision upon the skin of the patient, from which it is absorbed.

Cataphoresis depends upon the passage of certain substances between the two poles of a galvanic current, whereby the medicament is made to enter the skin and tissues. Massey uses it in the treatment of skin cancers.

Time of Administration.—Many drugs are given without regard to the time of eating. Such is usually the case in acute diseases, in which remedies must be given at frequent intervals, and in emergencies. When medicine is to be given three times a day it is usually best taken after eating. Such should be the direction in case the drug is likely to prove irritant to the stomach, as in prescribing iron, arsenic, iodin and their preparations. On the other hand, absorption is more rapid when the stomach is empty. Therefore, if rapidity of action is desired, give between meals. Also, if it is desired to affect the mucous membrane of the stomach itself, give the remedy on an empty stomach. Attention should also be paid to the stage of digestion; hydrochloric or other acids should never be taken during or immediately after eating—always one-half to one hour after.

Dosage.—The usual doses of drugs are given in the accompanying table. It should be remembered that much must be left to the judgment of the physician. Some patients have idiosyncrasies for certain drugs; others can take very large doses without effect. With prolonged administration tolerance may be acquired, necessitating increasingly larger doses. As a rule, men require larger doses than women and heavy persons more than light.

Age exerts a powerful influence. Children are peculiarly tolerant to some drugs, as mercury, and are very susceptible to otners, as opium and its alkaloids. The most convenient rule for computing the doses for children is Young's: To find the proportion to the adult dose, divide the child's age, in years, by its age plus 12. If the child is three years old, for example, the dose would be 3 divided by 3 plus 12, or $^{3}/_{15}$, or $^{1}/_{5}$ of the adult dose.

Cowling's rule is to divide the age at the next birthday by 24. Max Huhner (Med. Record) utilizes this rule by writing for children three-ounce mixtures containing 24-dram doses, or 24 pills, powders, or whatever is desired. For a child one year old, then, the total quantity of each drug used in the prescription is the same as the adult dose; if the child is two years old, twice this quantity is used; if three years old, three times, etc. For instance, the adult dose of syrup of ipecac being 10 minims and of ammonium chlorid 5 grains, we would put in twice these quantities in writing a prescription for a child two years of age, or:

Syrup of ipecac .....m. 20
Ammonium chlorid .....gr. 10
Simple syrup, enough to make.....oz. 3

Prescription Writing.—Much depends upon the care with which prescriptions are written and compounded. These points need special emphasis: (1) Legibility; write carefully and avoid abbreviations, which may lead to confusion. (2) Accuracy, especially with regard to quantities. (3) Avoid polypharmacy; put in your prescription only remedies which are distinctly needed. If several potent drugs of dissimilar action are needed, it is often better to give in different prescriptions, since the doses may need modification, or it may be necessary to stop the use of one of these entirely at any time. (4) Palatability. Every physician should study the art of covering the taste of nauseous medicines. A mixture should not be unnecessarily disagreeable to the taste or to the eye. Most drugs which cannot be made fairly endurable in a fluid mixture can be given in capsules, cachets, pills or otherwise. (5) If you cannot write a prescription in good Latin, write it in good English. There is seldom any need of surrounding your medication with mystery. Intelligent patients are likely to appreciate an air of candor; they feel that language was not meant to conceal one's thoughts. Chemical terms may be used if desired.

Apothecaries' and Metric Systems.—The tables of these systems of weights and measures are given in all elementary works and need not be repeated here. The apothecaries' system is well established by custom and is displaced with difficulty. The advantages of the metric system cannot, however, be questioned. It is easily learned. One obstacle which physicians themselves have created is the custom of duplicating, exactly, 4-ounce and 6-ounce mixtures in the metric system. The 100 Cc. mixture, or the 10 or 100 dose prescrip-

tion, should be the basis of prescribing. Remember that the system is essentially a decimal one. The relation between the metric and apothecaries' systems is shown below:

METRIC EQUIVALENTS

The unit of length is the *meter* (m.), 39.37 inches.
The decimeter is one-tenth the meter, 4 inches.
The centimeter is one-hundredth of the meter, 2-5 inch.
The millimeter is one-thousandth of the meter, 1-25 inch.
The Liter is the unit of capacity, 33.81 fluidounces.
The cubic centimeter (Cc.) is one-thousandth of a Liter, 16 minims.
The Kilogram is one-thousand Grams, 35 1-3 ounces.
The Gram (Gm.) is the unit of weight, 15.43 grains.
The decigram is one-tenth of a Gram, 1.54 grains.
The centigram is one-hundredth of a Gram, 1-6 grain.
The milligram is one-thousandth of a Gram, 1-64 grain.

APOTHECARIES' EQUIVALENTS.

The fluidounce equals 30.57 Cc.
The fluidram equals 4.70 Cc.
The minim equals 0.06 Cc.
The apothecaries' ounce equals 32.103 Gm.
The apothecaries' dram equals 4.888 Gm.
The grain equals 0.065 Gm.

If it is desired to convert a prescription written in the apothecaries' system into the metric system, multiply each item, expressed in drams, by 4. The result will be approximately the number of Gms. or Cc. To convert a metric prescription into apothecaries' measure, divide by 4. The result is approximately correct. To convert *grains* into the corresponding metric quantity, multiply the number of grains by 0.065. To reverse the process, divide by 0.065.

Combination of Drugs.—In making combinations of medicinal substances the physician should have a well-defined purpose. The following are indicated reasons: (1) To increase the efficiency of one or more of the ingredients. Thus a combination of cathartic drugs will often act more energetically than an equivalent amount of any one of them. (2) To modify or neutralize certain effects peculiar to some ingredients. For instance, caffein or other heart stimulants are prescribed with the coal-tar antipyretics to minimize their depressing action; or hyoscyamin may be given with aloes or podophyllin to prevent griping. (3) To act on different tissues at the same time. Thus, a febrifuge may be combined with an expectorant in acute bronchtis. (4) To make a new chemical combination. A familiar example is black wash. Another is the mixture of sodium bicarbonate and salicylic acid to obtain sodium salicylate. (5) To modify the physiological action in a way that would not be obtained by either alone. Thus, Dover's powder produces marked diaphoresis; neither opium nor ipecac alone does this. (6) To make the prescription palatable. For this reason

the potent agent is combined with syrups, elixirs, aromatics, confections, etc.

Incompatibles.—In writing prescriptions it is necessary to avoid incompatibles. These may be (1) physiological, as when drugs of opposite physiological action are given together; (2) chemical. The most common of the latter may be briefly epitomized as follows:

1. Acids and alkalies and substances containing them should never be combined unless you desire to make a new chemical combination. For instance, syrup of squills, containing acetic acid, releases CO_2 from carbonates.

2. Alkaloids (strychnin, morphin, quinin, etc.) are precipitated in solutions containing alkalies. In such a case the entire quantity of the alkaloid may be taken in the last dose.

3. Alkaloids precipitate in solutions containing tannic acid, salicylates, benzoates, iodids, bromids.

4. Tannic acid is incompatible with the alkaloids; also with many of the metals, notably iron, lead, silver, mercury, bismuth and antimony; with ferric salts it turns black and makes an ink. It is also incompatible with albumin, gelatin, gluten and starch. Tannic acid is present in small quantities in most of the tonic bitters and astringents. Iron may be prescribed with quassia and calumba.

5. Iodin and the iodids are incompatible with many substances and are best given alone. The soluble salts enter into new combinations with lead, mercury, silver, copper, arsenic, iron, bismuth, the nitrites, chlorates, chromates, permanganates and hydrogen peroxid. The alkaline iodids precipitate many of the alkaloids.

6. Mercuric chlorid (corrosive sublimate) is best given alone in most cases. It precipitates nearly all alkaloids and enters into combination with many minerals. It may be prescribed with potassium iodid, forming therewith a new but soluble salt. With lime water it gives a precipitate; this combination is called "yellow wash." It precipitates with glucosids, tannic acid and vegetable extractive matter.

7. Nitrate of silver should, as a rule, be given alone in solution or in pill form with a non-reducing excipient (kaolin and petroleum).

8. Potassium chlorate and potassium permanganate, when rubbed up dry with sulphur, tannic acid, sugar, glycerin, organic substances and other readily oxidizable matter, form explosive mixtures.

9. Antipyrin is incompatible with calomel and forms a green color with spirit of nitrous ether.

10. The synthetic compounds of phenol, methyl, ethyl, are, as a rule, decomposed by acids and alkalies; some react with

each other and they are therefore most safely prescribed alone in powder or dosage form, such as capsule or cachet.

11. The camphors are liquefied by solid phenols, such as thymol; also by hydrates, and these cannot therefore be combined in powder form.

12. Chloral and chloroform are decomposed by alkalies, and should not be combined.

TABLE OF DOSES AND SOLUBIILITIES.

Acetanilid; gr. 2 to 15, (Gm. 0.1 to 1.); insol. wat.; sol. alc.
Acid, arsenous; gr. $^1/_{64}$ to $^1/_{20}$. (Gm. 0.001 to 0.003); slight sol. wat.
— benzoic; gr. 5 to 15, (Gm. 0.3 to 1.); slight sol. wat., sol. alc.
— boric; gr. 5 to 10, (Gm. 0.3 to 0.65); sol. wat.
— camphoric; gr. 15 to 30, (Gm. 1. to 2.); insol. wat., sol. alc.
— carbolic; gr. ½ to 1½, (Gm. 0.03 to 0.1); sol. 20-30 parts wat., sol. alc.
— gallic; gr. 3 to 60, (Gm. 0.2 to 4.); sol. 100 parts wat., sol. alc.
— hydriodic, dil.; min. 10 to 60, (Cc. 0.65 to 4.).
— hydrobrom. dil.; min. 10 to 60, (Cc. 0.65 to 4.).
— hydrochlor. dil.; min. 5 to 20, (Cc. 0.3 to 1.3).
— hydrocyan. dil.; min. 2 to 6, (Cc. 0.1 to 0.35).
— nitric, dil.; min. 5 to 20, (Cc. 0.3 to 1.3).
— nitro-hydrochlor. dil.; min. 5 to 20, (Cc. 0.3 to 1.3).
— phosphoric. dil.; min. 5 to 30, (Cc. 0.3 to 2.).
— salicylic; gr. 5 to 20, (Gm. 0.3 to 1.3); slight sol. wat., sol. alc.
— sulphuric. dil.; min. 5 to 30, (Cc. 0.3 to 2.).
— sulphuric. arom.; min. 5 to 15, (Cc. 0.3 to 1.).
— tannic; gr. 2 to 10, (Gm. 0.1 to 0.65); very sol. wat., sol alc.
Aconitina; gr. $^1/_{300}$ to $^1/_{200}$. (Gm. 0.0002 to 0.0003); insol. wat., sol. alc.
Aconiti, ext.; gr. $^1/_{12}$ to ¼, (Gm. 0.005 to 0.015).
— fl. ext.; min. ½ to 1, (Cc. 0.03 to 0.06).
— tinct.; min. ½ to 5, (Cc. 0.03 to 0.3).
Adonidin; gr. $^1/_{10}$ to ⅓, (Gm. 0.006 to 0.02); sol. wat., alc.
Adrenal gland, gr. 1 to 5, (Gm. 0.06 to 0.3); sol. wat.
Agaricin, gr. $^1/_{12}$ to ¼, (Gm. 0.008 to 0.015); insol. wat.; slight sol. alc.
Agathin, gr. 8 to 15, (Gm. 0.5 to 1.); insol. wat., sol. alc.
Aloe, gr. 2 to 5, (Gm. 0.13 to 0.3).
— tinct., min. 15 to 60, (Cc. 1. to 4.).
Aloinum; gr. ⅛ to 3, (Gm. 0.008 to 0.2); slight sol. wat., sol. alc.
Aluminii et potassii sulph.; gr. 5 to 15, as emetic dr. 1 to 2; sol. wat., insol. alc.
Alumnol; locally 1 to 5% sol. or 10 to 20% as dusting powder.
Ammonii benzoas; gr. 10 to 20, (Gm. 0.65 to 1.3); sol. wat. and alc.
— bromid; gr. 5 to 30, (Gm. 0.3 to 2); very sol. wat. and in dil. alc.
— carb. gr. 3 to 10, (Gm. 0.2 to 0.65); very sol. wat.; slight sol. alc.
— chlorid; gr. 10 to 30, (Gm. 0.65 to 2.); very sol. wat., slight sol. alc.
— iodid, gr. 2 to 15, (Gm. 0.1 to 1); very sol. wat. and alc.
— salicylatis; gr. 2 to 15, (Gm. 0.1 to 1.0); sol. wat.
Amyl nitris, min. 2 to 5, (Cc. 0.1 to 0.35); insol. wat., sol. alc.
Amylene hydrate, min. 10 to 60, (Cc. 0.6 to 4.); sol. wat and alc.
Antimon. et pot. tart.: diaph., gr. $^1/_{20}$ to $^1/_{10}$, (Gm. 0.003 to 0.006); emetic, gr. 1 to 2, (Gm. 0.06 to 0.13); sol. wat., insol. alc.
Antinosine, locally $^1/_{10}$ to ½% sol.; sol. wat.
Antipyrin, gr. 2 to 15, (Gm. 0.1 to 1.); very sol. wat. and alc.
Antitoxin, diphtheria; 500 to 3000 units.
Apiol, min. 5 to 10, (Cc. 0.3 to 0.65); sol. alc.
Aphomorph. hydrochlor.; gr. $^1/_{30}$ to $^1/_{10}$, (Gm. 0.003 to 0.006); sol. 60 parts wat., 50 alc.
Argentamin, inject. 1:4000 wat. sol.
Argenti nitras; gr. $^1/_8$ to ½, (Gm. 0.01 to 0.03); very sol. wat., sol 26 parts alc.
— oxidum; gr. ½ to 2, (Gm. 0.032 to 0.13); insol. wat. and alc.
Argonin; inject 1 to 2% wat. sol.
Aristol; locally, insol. wat., slight sol. alc.
Arsenauro; min. 5 to 15, (Cc. 0.33 to 1.).
Arsenii bromid, gr. $^1/_{64}$ to $^1/_{16}$, (Gm. 0.001 to 0.004); usually given as Clemens' sol. (see Liq. Pot. Ars. et Brom. N. F.).
— iodidum, gr. $^1/_{64}$ to $^1/_{16}$, (Gm. 0.001 to 0.006); sol. wat and alc.
Asafoetidae, tinct., min. 30 to 60, (Cc. 2. to 4.).
Aspirin, gr. 15 to 30, (Gm. 1 to 2.); sol. 100 parts wat.
Atropinae sulphas, gr. $^1/_{128}$ to $^1/_{32}$, (Gm. 0.0005 to 0.002); very sol. wat., sol. alc.
Auri et sodii chlorid, gr. $^1/_{32}$ to ⅛, Gm. 0.002 to 0.008).
Belladonnae tinc., min. 2 to 15, (Cc. 0.1 to 1.).
— alc. ext., gr. $^1/_8$ to ½, (Gm. 0.01 to 0.03).
— fl. ext.; min. 1 to 3, (Cc. 0.06 to 0.02).
Buchu fl. ext.; min. 30 to 60, (Cc. 2. to 4.).

Benzoin, tinct; min. 20 to 40.
— co. tinct; min. 30 to 60.
Benzonaphthol; gr. 2 to 10, (Gm. 0.13 to 0.65); insol. wat., slight sol. alc.
Betanaphthol, gr. 2 to 5, (Gm. 0.13 to 0.32); insol. wat., sol. alc.
Bismuthi salicylas, gr. 5 to 20, (Gm. 0.3 to 1.3); insol. wat. and alc.
— subcarbonas, gr. 5 to 60, (Gm. 0.3 to 4.); insol. wat. and alc.
— subgallate, gr. 5 to 10 (Gm. 0.33 to 0.66); insol.
— subnitrate, gr. 5 to 60 (Gm. 0.33 to 4.); insol.
Bromipin; dr. 3 to 4; given in emulsion, flavored with peppermint and syrup.
Bromoformum, min. 1 to 10; (Cc. 0.06 to 0.65); sol. in alc.; insol. wat.
Buchu, fl. ext.; min. 15 to 60.
Butyl-chloral hydrate; gr. 5 to 10, (Gm. 0.32 to 0.65).
Caffeina, gr. 1 to 5; (Gm. 0.06 to 0.3); slight sol. wat., sol. alc.
— citrat.; gr. 2 to 10, (Gm. 0.12 to 0.6); sol. wat.
Cactus grandiflor. fl. ext.; min. 5 to 10, (Cc. 0.31 to 0.62).
Calcii chlorid. hydrat.; gr. 5 to 20, (Gm. 0.3 to 1.3); sol. wat. and alc.
— glycero-phosphas; gr. 2 to 5, (Gm. 0.12 to 3.); sol wat., insol. alc.
— lacto-phosphas; gr. 5 to 10, (Gm. 0.3 to 0.65); sol. wat.
— sulphid; gr. ¼ to 2, (Gm. 0.015 to 0.12); slight sol. wat.
Calumbae fl. ext.; min. 15 to 30, (Cc. 1. to 2.).
Camphor; gr. 2 to 5 (Gm. 0.12 to 3); sol. alc., insol. wat.
— monobrom, gr. 2 to 5, (Gm. 0.1 to 0.3); sol. alc., insol. wat.
Cannab. Ind. ext., gr. $^1/_{16}$ to ½. (Gm. 0.004 to 0.03).
— fl. ext., min. ½ to 1, (Cc. 0.03 to 0.06).
— tinct., min. 5 to 20, (Cc. 0.3 to 1.3).
Cantharides, tinct.; min. 1 to 10, (Cc. 0.06 to 6.).
Capsici, tinct., min. 8 to 15, (Cc. 0.5 to 1.).
Cardamon. tinct. and co. tinct.; dr. 1 to 2, (Cc. 4 to 8).
Cascarae sagrad. fl. ext.; min. 10 to 60, (Cc. 0.6 to 4.).
Castanea, fl. ext.; min. 15 to 60, (Cc. 1. to 4.).
Catechu, co. tinct.; dr. 1 to 4, (Cc. 4 to 16).
Cerii oxalas, gr. 1 to 10, (Gm. 0.06 to 0.6); insol. wat. and alc.
Chloral, gr. 3 to 20, (Gm. 0.2 to 1.3); very sol. alc. and wat.
Chloralamidum, gr. 15 to 60, (Gm. 1 to 4.); very sol. alc.; slight sol. wat.
Chloralose, gr. 3 to 15, (Gm. 0.2 to 1.); sol. alc., slight sol. wat.
Chloretone, gr. 5 to 30, (Gm. 0.3 to 2.); sol. alc., slight sol. wat.
Chloroformum, gr. 1 to 30, (Gm. 0.06 to 2.).
Chrysarobinum; external use.
Cimicifuga, ext.; gr. 2 to 6, (Gm. 0.12 to 0.4).
— fl. ext., min. 15 to 45, (Cc. 1. to 3.).
— tinct.; min. 30 to 60, (Cc. 2 to 4).
Cimicifugin; gr. ½ to 2, (Gm. 0.03 to 0.12); sol. alc.
Cinchonidina, and its salts, gr. 5 to 30, (Gm. 0.3 to 2.); slight sol. in wat. and alc., sol. dil. acids.
Cinchonae comp. tinct., min. 15 to 120, Cc. 1. to 8.).
Cocainae, hydrochl., gr. ¼ to 1, (Gm. 0.015 to 0.06); very sol. wat., sol. alc.; mainly local.
Codeina; gr. $^1/_{16}$ to 2, (Gm. 0.004 to 0.13); sol. alc., slight sol. wat.
— sulphat.; dose as above; sol. 40 parts water.
Colchicin, gr. $^1/_{100}$ to $^1/_{50}$, (Gm. 0.0006 to 0.0013).
Colchici, ext.; gr. ½ to 2, (Gm. 0.03 to .12).
— fl. ext., min. 2 to 8, (Cc. 0.12 to 0.05).
— tinct., min. 5 to 20, (Cc. 0.3 to 1.3).
Colocynthidis, comp. ext., gr. 5 to 15, (Gm. 0.3 to 1.).
Colocynthin; gr. $^1/_6$ to ⅔, (Gm. 0.01 to 0.04); sol. wat. and alc.
Conlina, and its salts, gr. $^1/_{100}$ to $^1/_{6}$, (Gm. 0.0006 to 0.01).
Conii ext.; gr. ½ to 2, (Gm. 0.03 to 0.12).
— fl. ext., min. 1 to 10, (Cc. 0.06 to 0.6).
Convallariae fl. ext., min. 5 to 30, (Cc. 0.3 to 2.)
Copaiba, bals.; gr. 15 to 60, (Gm. 1 to 4.).
Creosotum, gr. ½ to 20, (Gm. 0.032 to 1.3).
— carbonatis, min. 15 to 75, (Cc. 1. to 5), sol. alc. and oil, insol. wat.
— valerianate, gr. 3 to 3 0,(Gm. 0.19 to 2.); sol. alc., insol wat.
Creolin, gr. ½ to 5, (Gm. 0.03 to 0.3); sol. wat. to 2½%, sol. alc.
Croton chloral, gr. 1 to 5, (Gm. 0.06 to 0.3); sol. alc., slight. sol. wat.
Cubeba, gr. 2 to 60, (Gm. 0.12 to 4.).
Cupri acetas, gr. ⅛ to ½, (Gm. 0.008 to 0.03); sol. wat. and alc.
Cupri arsenis, gr. $^1/_{100}$, (Gm. 0.0006); slight. sol. wat.
Cupri sulphas, gr. $^1/_{16}$ to ¼, (Gm. 0.004 to 0.015); emetic gr. 2 to 10 (Gm. 0.12 to Gm. 0.6); sol. wat., insol. alc.
Digitalinum, gr. $^1/_{15}$ to ½; (Gm. 0.005 to 0.03); sol. wat. and alc.
Digitalis, gr. ⅛ to 2.; (Gm. 0.008 to 0.13).
— ext.; gr. ⅛ to 1, (Gm. 0.008 to 0.06).
— fl. ext.; min. 1 to 6, (Cc. 0.06 to 0.4).
— infus; fl. oz. 1 to 4, (Cc. 4 to 66).
— tinct.; min. 3 to 15, (Cc. 0.2 to 1.).
Dionin, gr. ¼ to 1, (Gm. 0.015 to 0.06); sol. wat. and alc.
Diuretin; gr. 15, (Gm. 1); sol. wat.
Duboisinae, sulph., gr. $^1/_{128}$ to $^1/_{30}$, (Gm. 0.0005 to 0.002); sol. wat. and alc.
Duotal, see guaiacol carb.
Elaterium, gr. $^1/_{80}$ to $^1/_{12}$, (Gm. 0.001 to 0.005); insol. wat. and alc.
Elaterium, gr. $^1/_{16}$ to ¼, (Gm. 0.004 to 0.015).
Emetin (alkaloid); emetic, gr. $^1/_{16}$ to ⅛, (Gm. 0.004 to 0.008), expectorant, gr. $^1/_{120}$ to $^1/_{60}$, (Gm. .0005 to 0.001); sol. alc., insol. wat.

Ergota, gr. 15 to 60, (Gm. 1. to 4.).
— ext., gr. ½ to 15, (Gm. 0.03 to 1.).
— fl. ext., min. 15 to 60, (Cc. 1. to 4.).
Ergotinum, gr. 2 to 8, (Gm. 0.13 to 0.5); sol. wat.
Erythroxyli fl. ext., min. 15 to 120, (Cc. 1. to 8.).
Eserina, sulphate, gr. $^1/_{64}$ to $^1/_{20}$, (Gm. 0.001 to 0.003); sol. wat.; locally in eye.
Ethyl bromid; by inhalation.
— chlorid; local anesthetic.
— iodidum, gr. 5 to 20, (Gm. 0.31 to 1.3); sol. alc., insol. wat.
Eucain, beta, local anesthetic 2 to 4% sols.
Eucalypti fl. ext., min. 5 to 30, (Cc. 0.03 to 2.).
Eucalyptol, min. 5 to 15, (Cc. 0.3 to 1); sol. alc. and oils, insol. wat.
Eudoxin, gr. 5 to 15, (Gm. 0.3 to 1.) insol.
Euphorbiae piluliferae extractum, gr. 30 to 60, (Gm. 2. to 4.).
Europhen, gr. ¼ to 2, (Gm. 0.016 to 0.13).
Euquinin; gr. 2 to 15, (Gm. 0.12 to 1.); sol. alc., slight. sol. wat.
Europhen; gr. ½ to 1½, (Gm. 0.03 to 0.1) and locally.
Exalgin, gr. 2 to 6, (Gm. 0.15 to 0.4).
Ferri chloridi, tinct.; min. 10 to 30, (Cc. 0.6 to 2.).
Fel bovis purif., gr. 5 to 10 (Gm. 0.3 to 0.65).
Ferri arsenat, gr. $^1/_{20}$ to $^1/_6$, (Gm. 0.003 to 0.01)
— bromid, gr. 1 to 5, (Gm. 0.66 to 0.3).
— carb. saech., gr. 2 to 15, (Gm. 0.1 to 1.).
— hypophosphis, gr. 5 to 10, (Gm. 0.3 to 0.65).
— iodidum saech., gr. 2 to 5, (Gm. 0.13 to 0.33).
— lactas, gr. 1 to 3, (Gm. 0.06 to 0.2).
— oxid. hydrat. cum. magnes, fl. oz. ½ to 1, (Cc. 16. to 32.).
— pyrophosphas, gr. 1 to 5, (Gm. 0.6 to 0.3).
— sulphas, gr. 1 to 3, (Gm. 0.06 to 0.2).
— sulphas exsiccat, gr. ½ to 2½, (Gm. 0.03 to 0.15).
— valer, gr. 1 to 3, (Gm. 0.06 to 0.2).
Ferrum dialys, gr. 1 to 15, (Gm. 0.06 to 1.).
— redact, gr. 1 to 5, (Gm. 0.06 to 0.3).
Gelsemii fl. ext., min. 2 to 5, (Cc. 0.13 to 0.3).
— tinct., min. 2 to 15, (Cc. 0.1 to 1.).
Gossypii fl. ext., min. 15 to 60, (Cc. 1. to 4.).
Grindeliae rob. fl. ext., min. 10 to 60, (0.6 to 4.).
Guaranae fl. ext., min. 30 to 120, (Cc. 2. to 4.).
Guaiaci ammon, tinct., min. 30 to 60, (Cc. 2. to 4.).
Guaiacol, internally, gr. ¼ to 5, (Gm. 0.015 to 0.3); topically, gr. 10 to 60, (Gm. 1.3 to 4.); sol. alc. glyc. and oils, insol. wat.
— carbonas; gr. $^1/_3$ to 10, (Gm. 0.02 to 0.6); slight. sol. alc., insol. wat.
— valerianas; gr. 2 to 20, (Gm. 0.12 to 1.3).
Hæmatoxyli, ext.; gr. 10 to 30, (Gm. 0.6 to 2.).
Hæmogallol; gr. 4 to 8, (Gm. 0.25 to 0.5), insol.
Hæmoglobin; gr. 20 to 40, (Gm. 1.3 to 2.6), sol. wat.
Heroin, gr. $^1/_{12}$ to $^1/_8$, (Gm. 0.005 to 0.01).
Holocainæ, hydrochloras; locally 1% in eye.
Homatropinæ hydrobrom.; locally 1% in eye.
Hydrarg. chlor. corros.; gr. $^1/_{64}$ to $^1/_{10}$, (Gm. 0.001 to 0.006).
— chlor. mite; gr. $^1/_{10}$ to 10, (Gm. 0.004 to 0.65).
— iodid rub.; gr. $^1/_{50}$ to $^1/_{10}$. (Gm. 0.0013 to 0.006).
— iodid. flav.; gr. $^1/_8$ to 1, (Gm. 0.01 to 0.06).
— subsulphas flav.; emetic, gr. 2 to 5, (Gm. 0.12 to 0.3).
— c. creta; gr. 3 to 8, (Gm. 0.2 to 0.5).
Hydrastin (alkaloid); gr. ¼ to 1, (Gm. 0.015 to 0.06); slight. sol. wat. and alc.
— hydrochloras; gr. ½ to 1 (Gm. 0.03 to 0.06); sol. wat. and alc.
Hydrastinin hydrochloratis; gr. $^1/_{12}$ to $^1/_8$, (Gm. 0.005 to 0.01); sol. wat. and alc.
Hydrastis fl. ext., min. 10 to 120, (Cc. 0.6 to 2.).
— tinct., min. 30 to 120, (Cc. 2. to 8.).
Hydrogeni dioxid.; min. 30 to 120, (Cc. 2. to 8.) and locally.
Hyoscinæ hydrobrom., gr. $^1/_{200}$ to $^1/_{70}$, (Gm. 0.0003 to 0.0009); sol. wat. and alc.
Hyoscyami, alc. ext., gr. ½ to 2, (Gm. 0.03 to 0.13).
— fl. ext., gr. 2 to 8, (Cc. 0.1 to 0.5).
Hyoscyami, tinct., min. 5 to 30, (Cc. 0.3 to 2.).
Hyoscyaminæ sulph.; gr. $^1/_{200}$ to $^1/_{80}$, (Gm. 0.0003 to 0.001); sol. wat. and alc.

Ichthalbin; gr. 2 to 5, (Gm. 0.13 to 0.3); sol. alkaline fluids.
Ichthyol (locally, 10 to 50%); internally, gr. 3 to 5, (Gm. 0.2 to 0.3); sol. wat. oils.
Ignatiæ ext., gr. ⅛ to ½, (Gm. 0.008 to 0.03).
Ignatia, tinct., min. 5 to 30, (Cc. 0.3 to 2.).
Iodoform, gr. 1 to 5, (Gm. 0.06 to 0.3).
Iodum; gr. $^1/_{10}$ to ¼, (Gm. 0.006 to 0.015).
— tinct.; min. 2 to 5, (Cc. 0.12 to 0.3).
Iodipin; dr. 1 to 2, (Cc. 4. to 8.).
Iodi, comp., tinct., min. 7 to 15, (Cc. 0.06 to 1.).
Ipecac; expect., gr. $^1/_8$ to 1, (Gm. 0.01 to 0.06), emet., gr. 15 to 30, (Gm. 1. to 2.).
— syrup; min. 10 to dr. 4, (Cc. 0.6 to 16.).
— vinum; min. 5 to dr. 3, (Cc. 0.3 to 12.).
Iridis fl. ext., min. 5 to 10, (Cc. 0.3 to 0.65).
Jalap; gr. 15 to 30, (Gm. 1. to 2.).
— ext., gr. 5 to 10, (Gm. 0.3 to 0.65).

Kava-kava, fl. ext., min. 15 to 60, (Cc. 1. to 4.).
Kino, tinct.; min. 15 to 120, (Cc. 0.1 to 8.).
Kryofin; gr. 10 to 30, (Gm. 0.65 to 2.); insol. wat., sol alc.
Lactophenin; (antipyretic), gr. 8 to 15, (Gm. 0.5 to 1.); insol. wat., sol. alc.
Leptandræ fl. ext., min. 20 to 30, (Cc. 1.3 to 2.).
Liq. ammon. acet.; fl. dr. 2 to 8, (Cc. 8. to 32.).
— arsen. et hydr. iod.; min. 1 to 5, (Cc. 0.06 to 1.).
— potassii arsenit.; min. 1 to 5, (Cc. 0.06 to 1.).
— sodii arsenatis; min. 1 to 5, (Cc. 0.06 to 1.).
— ferri chloridi; min. 2 to 10, (Cc. 0.15 to 0.65).
— ferri dialys; min. 10 to 30, (Cc. 0.65 to 2.).
— potassii citrat.; fl. dr. 2 to 4, (Cc. 8. to 16.).
Lithii benzoas; gr. 5 to 20, (Gm. 0.3 to 1.3); sol. wat. and alc.
— carb., gr. 2 to 10, (Gm. 0.13 to 0.65); slight, sol. wat., insol. alc.
— citras, sol. wat.; insol. alc.
Lobeliæ fl. ext., min. 1 to 5, (Cc. 0.06 to 0.3).
Lobeliæ, tinct.; min. 5 to 30, (Cc. 0.3 to 2.).
Lupulin; gr. 10 to 20, (Gm. 0.66 to 1.3).
Lycetol; gr. 4 to 10, (Gm .25 to .6); sol. wat.
Lysidin; gr. 15 to 30, (Gm. 1. to 2.); miscible with wat.
Magnesii carb.; gr. 15 to 60, (Gm. 1. to 4.); insol.
— oxid; gr. 15 to 60, (Gm. 1. to 4.).
Magnesii citr. gran., dr. 2 to 8, (Gm. 8. to 32.).
Mangani oxid nigr.; gr. 1 to 5, (Gm. 0.06 to 0.3).
Massa copaibæ; gr. 5 to 30, (Gm. 0.3 to 2.).
Massa ferri carb.; gr. 5 to 15, (Gm. 0.3 to 1.).
Massa hydrarg.; gr. 1 to 15, (Gm. 10.06 to 1.).
Matico fl. ext.; min. 30 to 60, (Cc. 2. to 4.).
Menthol; gr. 3 to 5, (Gm. .2 to .3); sol. alc. and olive oil.
Mercurol; inject. 1 to 3% sol.
Methylene-blue; gr. 1 to 5, (Gm. 0.06 to 0.3); in capsules with powd. nutmeg.
Mist. asafœtidae; fl. dr. 4 to 8, (Cc. 6. to 32.).
Mist. chloroformi; fl. dr. 1 to 8, (Cc. 4. to 32.).
— ferri et amm. acet.; fl. dr. 1 to 4, (Cc. 4. to 32.).
— glycyrrhizae, comp.; fl. dr. 1 to 4, (Cc. 4. to 32.).
— magnes. et asafœt.; fl. dr. 1 to 4, (Cc. 4. to 32.).
— rhei et sodæ; fl. oz. ½ to 1, (Cc. 16. to 32.).
Morphina and its salts; gr. $^1/_{16}$ to ½, (Gm. 0.004 to 0.03).
Morrhuol, gr. 3 to 60, (Gm. 0.15 to 4).
Moschi, tinct., min. 15 to 60, (Cc. 1. to 4.).
Moschus, gr. 2 to 15, (Gm. 0.1 to 1.).
Naphthalin, gr. 5 to 20, (Gm. 0.3 to 1.3); sol. alc., olive oil, turpentine, insol. wat.
Nitro-glycerinum, 1% sol.; gtt. 1 increased.
Nucis vomicæ, ext., gr. ⅛ to ½, (Gm. 0.008 to 0.03).
— — fl. ext., min. 1 to 5, (Cc. 0.06 to 0.3).
—— tinct., min. 5 to 15, (Cc. 0.3 to 1.).
Oleoresina aspidii, gr. 15 to 60, (Gm. 1.0 to 4.0).
— capsici, gr. $^1/_8$ to ½, (Gm. 0.01 to 0.3).
— cubebæ, gr. 5 to 20, (Gm. 0.3 to 1.3).
Oleum copaibae, gr. 8 to 15, (Gm. 0.5 to 1.).
— erigerontis, gr. 5 to 15, (Gm. 0.3 to 1.).
— eucalypti, gr. 5 to 10, (Gm. 0.3 to 0.6).
— gaultheriæ; gr. 3 to 10, (Gm. 0.2 to 0.65).
— phosphoratum; gr. 1 to 3, (Gm. 0.06 to 0.2).
— santali; gr. 10 to 30, (Gm. 0.7 to 2.).
— terebinthinæ; gr. 2 to 30, (Gm. 0.12 to 2.).
— tiglii; gtt. ½ to 2, (Gm. 0.03 to 0.12).
Opii ext.; gr. ⅛ to 1, (Gm. 0.008 to 0.06).
— tinct.; min. 2 to 15, (Cc. 0.1 to 1.).
— camph. tinct.; min. 5 to 240, (Cc. 0.3 to 16.).
Opium, gr. ¼ to 2, (Gm. 0.008 to 0.12).
Orthoform; local use.
Pancreatin, gr. 10 to 20, (Gm. 0.7 to 1.3); powd. or tablets.
Papain; gr. 2 to 5, (Gm. 0.12 to 0.3); sol. wat. and glyc.
Paraldehyd; gr. 20 to 60, (Gm. 1.3 to 4.); sol. alc., oils and 10 parts wat.
Pareira, fl. ext.; min. 30 to 60, (Cc. 2. to 4.).
Pelletierini, tannas; gr. 8 to 24, (Gm. 0.5 to 1.5); sol. in 80 parts water.
Pepsin; gr. 5 to 15, (Gm. 0.3 to 1.); sol. wat., insol. alc.
Phenacetin; gr. 2 to 10, (Gm. 0.1 to 0.6); insol. wat., sol. alc.
Phenalgin; gr. 5 to 10 (Gm. 0.3 to 0.6).
Phenocoll hydrochlorid; gr. 8 to 15, (Gm. 0.5 to 1.); sol. 16 parts wat.
Phosphorus; gr. $^1/_{125}$ to $^1/_{50}$, (Gm. 0.0005 to 0.0013); sol. oils.
Physostigmatis, ext.; gr. $^1/_{16}$ to $^1/_8$, (Gm. 0.004 to 0.01).
— tinct.; min. 5 to 15, (Cc. 0.3 to 1.).
Picrotoxinum; gr. $^1/_{60}$ to $^1/_{10}$, (Gm. 0.0011 to 0.0065); sol. alc., slight, sol. wat.
Pilocarpi fl. ext.; min. 5 to 30, (Cc. 0.3 to 2.).
Pilocarpina, hydrochloras; gr. $^1/_{24}$ to ½, (Gm. 0.001 to 0.03); sol. wat. and alc.
Piperazin; gr. 15 (daily), (Gm. 1 (daily)); very sol. wat.
Plumbi acetas; gr. ½ to 3, (Gm. 0.03 to 0.2).
Podophylli; gr. ½ to 3, (Gm. 0.03 to 0.2).
Potassii acetas; gr. 15 to 60, (Gm. 1. to 4.); very sol. wat.
— bichromas; gr. $^1/_{16}$ to $^1/_8$, (Gm. 0.004 to 0.01); sol. wat.

— bitartras; gr. 8 to 60, (Gm. 0.5 to 4.); slight. sol. wat.
— bromid; gr. 15 to 60, (Gm. 1. to 4.); very sol. wat.
— chloras; gr. 5 to 20, (Gm. 0.3 to 1.3); sol. 17 parts wat., insol. alc.
— citras; gr. 10 to 30, (Gm. 0.6 to 2); very sol. wat.
— cyanidum, gr. $^1/_{20}$ to $^1/_8$, (Gm. 0.003 to 0.008); sol. wat.
— iodidum, gr. 5 to 60, (Gm. 0.3 to 4.); very sol. wat., sol. alc.
— nitras, gr. 2 to 15, (Gm. 0.13 to 1.); sol. wat.
— permanganas, gr. ½ to 5, (Gm. 0.03 to 0.32); sol. wat.
Protargol, gr. 1 to 3, (Gm. 0.06 to 0.2), injection ¼ to 2% sol.; sol. wat.
Prun. virg. fl. ext., min. 30 to 60, (Cc. 2. to 4.).
Pulsatillae fl. ext., min. 2 to 5, (Cc. 0.1 to 0.3).
Pulv. antimonialis, gr. 1 to 3, (Gm. 0.06 to 0.2).
— glycyrrhizae, comp., gr. 30 to 60, (Gm. 2. to 4.).
— ipecac. et opii, gr. 5 to 15, (Gm. 0.3 to 1.).
— jalapæ comp., gr. 10 to 60, (Gm. 0.6 to 4.).
— morphinae comp., gr. 5 to 15, (Gm. 0.3 to 1.).
— rhei comp., gr. 5 to 60, (Gm. 0.3 to 4.).
Quebracho fl. ext., min. 20 to 60, (Cc. 1.3 to 4.).
Resina copaibæ, gr. 2 to 10, (Gm. 0.13 to 0.65).
— euonymi, gr. 2 to 10, (Gm. 0.13 to 0.3).
— guaiaci, gr. 5 to 20, (Gm. 0.3 to 1.3).
— jalapæ, gr. 2 to 5, (Gm. 0.13 to 0.3).
— podophylli, gr. $^1/_{12}$ to ½, (Gm. 0.005 to 0.03).
— scammonii, gr. 2 to 10, (Gm. 0.13 to 0.65).
Resorcin, gr. 2 to 5, (Gm. 0.1 to 0.3); sol. alc., wat.
— fl. ext., min. 5 to 30, (Cc. 0.3 to 2.).
Rheum, tonic, gr. 3 to 10, (Gm. 0.02 to .06), laxative, gr. 10 to 30, (Gm, 0.6 to 2.).
— arom. tinct.; dr. ½ to 2, (Gm. 2. to 8.).
— arom. syr.; dr. 4, (Gm. 16), for child.
— syrup; dr. 1, (Gm. 4.) for child.
Salacetol; gr. 20 to 40, (Gm. 1.3 to 2.6).
Salicin; gr. 10 to 30, (Gm. 0.6 to 2.); sol. 30 parts water.
Salipyrin, gr. 8 to 15, (Gm. 0.5 to 1.); slightly sol. wat. and alc.
Salol, gr. 2 to 10, (Gm. 0.15 to 0.65); insol. wat., slightly sol. alc.
Salophen, gr. 15 to 20, (Gm. 0.3 to 1.3); insol. wat., sol. alc.
Sanguinariæ, fl. ext.; min. 3 to 20, (Cc. 0.02 to 1.3).
Santoninum, gr. ¼ to 5, (Gm. 0.015 to 0.3); insol. wat.; slightly sol. alc.
Scillæ fl. ext., min. 2 to 3, (Cc. 0.1 to 0.2).
Scoparii fl. ext., min. 15 to 60, (Cc. 1 to 4.).
Scopolaminæ hydrochlor. gr. $^1/_{240}$ to $^1/_6$, (Gm. 0.00027 to 0.011).
Senegæ fl. ext., min. 1 to 5, (Cc. 0.06 to 0.3).
Senna, gr. 8 to 180, (Gm. 0.05 to 12).
Sennæ fl. ext., min. 60 to 240, (Cc. 4. to 16.).
Serpentariæ fl. ext., min. 20 to 30, (Cc. 1.3 to 2.).
Sodii arsenas, gr. $^1/_{64}$ to $^1/_{10}$, (Gm. 0.001 to 0.006); sol. wat.
— benzoas, gr. 5 to 15, (Gm. 0.2 to 1.); sol. wat.
— bicarbonas, gr. 15 to 60, (Gm. 1 to 4); sol. wat.
— boras, gr. 5 to 30, (Gm. 0.3 to 2.); sol. wat.
— bromid, gr. 10 to 60, (Gm. 0.6 to 4); very sol. wat.
— ethylas, local use as escharotic.
— hyposulphis, gr. 5 to 20, (Gm. 0.3 to 1.3); sol. wat.
— iodidum, gr. 2 to 30, (Gm. 0.13 to 2.); sol. wat.
— nitras, gr. 1 to 5, (Gm. 0.065 to 0.032); sol. wat.
— phosphas, gr. 2 to 120, (Gm. 0.13 to 8.); sol. wat.
— cacodylas; gr. 2 to 10, (Gm. 0.1 to 0.6); sol. wat.
— salicylas; gr. 5 to 30, (Gm. 0.3 to 2.); sol. wat.
— sulphocarbolas; gr. 5 to 20, (Gm. 0.3 to 1.3); sol. wat.
Sparteinæ sulph, gr. $^1/_{16}$ to 4, (Gm. 0.004 to 0.25); sol. wat. and alc.
Spigeliæ fl. ext., min. 10 to 60, (Cc. 0.6 to 1.).
Spiritus ætheris nitrosi, gr. 15 to 120, (Gm. 1. to 8.).
— æther. comp.; gr. 15 to 120, (Gm. 1. to 8.).
— ammoniæ arom.; gr. 15 to 60, (Gm. 1. to 4.).
— camphoræ; gr. 5 to 30, (Gm. 0.3 to 2.).
— chloroformi; gr. 15 to 60, (Gm. 1. to 4.).
Stillingiæ fl. ext.; min. 15 to 45, (Cc. 1. to 3.).
Stramonii, tinct.; min. 5 to 15, (Cc. 0.3 to 0.9).
— ext., gr. ¼ to ½, (Gm. 0.015 to 0.03).
Strontii lactas, gr. 5 to 30, (Gm. 0.3 to 2.); sol. wat. and alc.
Strophanthi, tinct. min. 2 to 10, (Cc. 0.1 to 0.65).
Strychninæ, nitros, gr. $^1/_{64}$ to $^1/_{12}$, (Gm. 0.001 to 0.005); sol. wat. and alc.
— sulphas, dose same as above.
Stypticin; gr. 1 to 4, (Gm. 0.06 to 0.25) and externally; sol. wat. and alc.
Sulphonal; gr. 5 to 20, (Gm. 0.3 to 1.3); slightly sol. in wat. and alc.
Sulphur, dr. ½ to 4, (Gm. 2. to 16.).
Syr. ferri iodidi, gr. 5 to 30, (Gm. 0.03 to 2.).
— scillæ comp., gr. 5 to 30, (Gm. 0.03 to 2.).
Tannalbin; gr. 5 to 15, (Gm. 0.3 to 1.); insol. wat.
Tannigen; gr. 5 to 30 (Gm. 0.3 to 2.); insol. wat.
Taraxaci, gr. 5 to 60, (Gm. 0.3 to 4.).
Terebene; gr. 5 to 15, (Gm. 0.3 to 1.); sol. alc., slight. sol. wat.

Terpin hydrate; gr. 2 to 5, (Gm. 0.13 to 0.3); sol. 10 parts alcohol, slightly sol. wat.
Theobrominæ et sodii salecylas; gr. 5 to 30, (Gm. 0.3 to 2.); slightly sol. wat.
Thiocol; gr. 5 to 15, (Gm. 0. 3 to 1); sol. wat. and syrup.
Thymol, gr. 1 to 5, (Gm. 0.06 to 0.3); sol. 1 part alc., 1500 wat.
Thyroid gland, gr. 1 to 5, (Gm. 0.06 to 0.3).
Trional; gr. 15 to 60, (Gm. 1 to 4); sol. alc., slightly sol wat.
Uranium nitrate; gr. 5 to 10, (Gm .0.32 to 0.65), sol. wat.
Urethane; gr. 5 to 30, (Gm. 0.3 to 2); sol. wat. and alc.
Urotropin; gr. 3 to 10, (Gm. 0.2 to 0.65); sol. wat.
Uvæ ursi fl. ext.; min. 30 to 60, (Cc. 2 to 4).
Valerianæ ammon. tinct.; min. 10 to 120, (Cc. 0.6 to 8).
— fl. ext., min. 30 to 60, (Cc. 2 to 4).
Veratri. vir., tinct., min. 3 to 10, (Cc. 0.2 to 0.6).
— fl. ext.; min. 2 to 8, (Cc. 0.1 to 0.5).
Viburni prunifolii fl. ext., min. 30 to 60, (Cc. 2 to 4).
Vinum antimonii; expectorant and alterative, min. 1 to 8, (Cc. 0.06 to 0.5); emetic., min. 30 to 75, (Cc. 2 to 5).
— colchici, min. 5 to 15, (Cc. 0.3 to 1).
— ergotæ, min. 1 to 3, (Cc. 4 to 12).
— ipecac.; expectorant, min. 5 to 15, (Cc. 0.3 to 1), emetic, dr. 2 to 6, (Cc. 8 to 24).
opii; min. 5 to 15, (Cc. 0.3 to 1).
Zinci acetas; gr. ½ to 2, (Gm. 0.03 to .13); sol. wat.
- oxid; gr. 1 to 5, (Gm. 0.06 to 0.3) and externally.
— phosphid; gr. $^1/_{10}$ to $^1/_6$, (Gm. 0.006 to —0.01); insol.
— sulphas; alterative, gr. ¼ to 6, (Gm. 0.015 to 0.4), emetic, gr. 5 to 15, (Gm. 0.3 to 1); sol. wat. insol. alc.
— sulphocarbolas; gr. 5 to 15, (Gm. 0.3 to 1); sol. wat. and alc.
— valerianas; gr. ½ to 5 (Gm. 0.03 to 0.3); slightly sol. wat. and alc.

EPITOME OF THE NATIONAL FORMULARY.

Physicians should be more familiar with the excellent series of combinations contained in the National Formulary. These have been prepared under the direction of the American Pharmaceutical Association and have the endorsement of that body. While not strictly official they are nevertheless understood and readily prepared by any competent pharmacist. It is only necessary to prescribe them by name, followed by "N. F." in parentheses.

These formulas will repay study by any physician who desires to prescribe at the same time efficient and palatable preparations. The author has re-classified them according to their therapeutic uses. Each formula appears but once, so that those having several uses should be looked for under different heads.

ALTERATIVES.

Amylum Iodatum (U. S. P., 1880).—"Iodized Starch."

Composition: Iodin, 5 Gm.; Starch, 95 Gm. Med Properties: Alterative. Use: Internally as a non-irritant substitute for Iodin. Dose: 4 to 8 Gm. (1 to 2 drams) or more.

Elixir Corydalis Compositum.—"Compound Elixir of Corydalis."

Composition: Fliud Extract of Corydalis ("Turkey Corn"), Fluid Extract of Stillingia, of each 60 Cc.; Fluid Extract of Xanthoxylum, 30 Cc.; Fluid Extract of Iris ("Blue Flag"), 90 Cc.; Potassium Iodid, 50 Gm.; Alcohol, 125 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Alterative, Diuretic, Tonic. Use: In scrofula, rheumatism, gout, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Elixir Stillingiae Compositum.—"Compound Elixir of Stillingia."

Composition: Compound Fluid Extract of Stillingia (Form. 176), 250 Cc.; Aromatic Elixir, 750 Cc. Med. Properties: Alterative, Laxative, Cholagogue. Uses: In chronic rheumatism, syphilis, scrofula, etc. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Extractum Araliae Racemosae Fluidum.—"Fluid Extract of American Spikenard."

From the root of Aralia racemosa, L., with a mixture of 2 volumes of Alcohol and 1 volume of Water. Med. Properties: Alterative, Stimulant, Diaphoretic. Uses: In syphilis, scrofula, rheumatism, etc. Dose: 2 to 4 Cc. (one-half to one fluidram).

Extractum Arnicae Florum Fluidum.—"Fluid Extract of Arnica Flowers."

From the flower heads of Arnica montana, L., with Diluted Alcohol. Med. Properties: Tonic, Alterative, Antiseptic. Uses: Internally in rheumatism, catarrhal affections, dropsy, etc. Dose: 0.5 to 2.0 Cc. (8 to 30 minims).

Extractum Calendulae Fluidum.—"Fluid Extract of Marigold."

From the flowering herb of Calendula officinalis, L., with a mixture of 2 volumes of Alcohol and 1 volume of Water. Med. Properties: Tonic, Alterative, Stimulant. Uses: Internally, in jaundice, scrofula, amenorrhea; externally, for bruises. Dose: 1 to 4 Cc. (15 to 60 minims).

Extractum Coptis Fluidum.—"*Fluid Extract of Goldthread.*"

From the rhizome and rootlets of Coptis trifolia, Salisb., with Diluted Alcohol. Med. Properties: Tonic, Vulnerary. Uses: Internally in debility; locally in ulcerations of the mouth. Dose: 2 to 4 Cc. (one-half to one fluidram).

Extractum Corydalis Fluidum.—"Fluid Extract of Turkey Corn."

From the tubers of Dicentra canadensis, D. C., with a mixture of 3 volumes of Alcohol and 1 volume of Water. Med. Properties: Alterative, Tonic, Diuretic. Uses: In scrofula and syphilis. Dose: 0.6 to 3 Cc. (10 to 45 minims).

Extractum Fuci Fluidum.—"Fluid Extract of Bladder-wrack."

From the thaleus of Fucus vesiculosus, L., with a mixture of 3 volumes of Alcohol and 1 volume of Water. Med. Properties: Deobstruent, Alterative. Uses: In obesity, scrofula, etc. Dose: 0.6 to 2 Cc. (10 to 30 minims).

Extractum Helianthemi Fluidum.—"Fluid Extract of Frostwort."

From the herb of Helianthemum canadense, Mich., with Diluted Alcohol. Med. Properties: Tonic, Astringent, Alterative. Uses: In dysentery, scrofula, secondary syphilis, etc. Dose: 2 to 8 Cc. (one-half to two fluidrams).

Extractum Mezerei Fluidum.—"Fluid Extract of Mezereum."

From the bark of Daphne Mezereum, L., with Alcohol. Med. Properties: Alterative, Rubefacient. Uses: Internally, in rheumatism, syphilis, etc.; externally, as an irritant. Dose: 0.3 to 1 Cc. (5 to 15 Minims).

Extractum Stillingiae Fluidum Compositum.—"Compound Fluid Extract of Stillingia."

From Stillingia, Corydalis (root), of each 250 Gm.; Blue Flag, Sambucus, Chimaphila, of each 125 Gm.; Coriander, 65 Gm.; Prickly Ash Berries, 60 Gm.; with a mixture of 2 volumes of Alcohol, 1 volume of Glycerin, and 1 volume of Water. Med. Properties: Alterative. Uses: In scrofula, syphilitic affections, etc. Dose: 2 to 4 Cc. (one-half to one fluidram).

Glyceritum Guaiaci.—"Glycerite of Guaiac."

Composition: Guiaiac, 85 Gm.; Solution of Potassa, 65 Cc.; Glycerin, 600 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Alterative, Antispasmodic, Diaphoretic, Expectorant. Uses: In syphilis, gout, as addition to gargle in ulcerated throat, etc. Dose: 2 to 4 Cc. (one-half to one fluidram).

Liquor Auri et Arsenii Bromidi.—"Solution of Bromid of Gold and Arsenic."

Composition: Arsenous Acid, 2.5 Gm.; Tribromid of Gold, 3.25 Gm;. Bromin Water, to effect solution; Distilled Water, enough to make 1,000 Cc. Med. Properties: Tonic, Alterative. Uses: In eczema and other skin diseases; in epilepsy, diabetes, etc. Dose: 0.2 to 0.6 Cc. (3 to 10 minims).

Liquor Hydrargyri et Potassii Iodidi.—"Channing's Solution."

Composition: Red Iodid of Mercury, 10 Gm.; Potassium Iodid, 8 Gm.; Distilled Water, 1,000 Cc. Med. Properties: Alterative. Uses: In constitutional syphilis. Dose: 0.2 to 0.6 Cc. (3 to 10 minims). Makes a 1 per cent solution, approximately.

Liquor Potassii et Bromidi.—"Clemens' Solution."

Composition: Arsenous Acid, 10 Gm.; Potassium Bicarbonate, 40.5 Gm.; Bromin, 16 Gm.; Water, enough to make 1,000 Gm. Med. Properties: Alterative, Antiperiodic, Tonic. Uses: In fevers, affections of the skin, chorea, etc. Dose: 0.06 to 0.3 Cc. (1 to 5 minims). A 1 per cent arsenical solution.

Liquor Sodii Arsenatis, Pearson.—"Pearson's Solution of Sodium Arsenate."

Composition: Sodium Arsenate, 1 Gm.; Distilled Water, 600 Cc. Med. Properties: Alterative, Tonic, Antiperiodic. Uses: In affections of the skin, fevers, chorea, etc. Dose: 0.2 to 0.5 Cc. (3 to 8 minims).

Syrupus Asari Compositus.—"Compound Syrup of Canada Snake Root."

Composition: Asarum, 60 Gm.; Cochineal, 1.5 Gm.; Potassium Carbonate, 2.5 Gm.; Wine of Ipecac, 30 Cc.; Alcohol, 185 Cc.; Sugar, 700 Gm.; Water, enough to make 1,000 Cc. Med. Properties: Tonic, Stimulant, Carminative, Resolvent. Uses: In atonic conditions from fevers. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Syrupus Calcii Iodidi.—"Syrup of Iodid of Calcium."

Composition: Iodin, 76 Gm. (Iron Wire, 28 Gm.); Precipitated Calcium Carbonate, 34 Gm.; Sugar, 700 Gm.; Distilled Water, Syrup, of each enough to make 1,000 Cc. Med. Properties: Antiseptic, Alterative, Depressant. Uses: In phthisis, scrofula, erysipelas. Dose: 1 to 4 Cc. (15 to 60 minims).

Syrupus Sanguinariae.—"Syrup of Blood Root."

Composition, Sanguinaria, 225 Gm.; Acetic Acid, 125 Cc.; Sugar, 800 Gm.; Water, enough to make 1,000 Cc. Med. Properties: Expectorant, Alterative, Narcotic, Emetic. Uses: For coughs and bronchitis. Dose: 1 to 3 Cc. (15 to 45 minims). Each fluidram represents 13 grains of Sanguinaria.

Syrupus Stillingiae Compositus.—"Compound Syrup of Stillingia."

Composition: Compound Fluid Extract Stillingia (Form. 176), 250 Cc.; Sugar, 700 Gm.; Water, enough to make 1,000 Cc. Med.

Properties: Alterative. Uses: In scrofula, syphilitic affections, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Vinum Fraxini Americanae.—"Wine of American Ash."

Composition: Fraxinus Bark, 500 Gm.; Stronger White Wine (Form. 440), enough to make 1,000 Cc. Med. Properties: Alterative, Tonic, Emmenagogue. Uses: In dysmenorrhea. Dose: 4 to 8 Cc. (1 to 2 fluidrams). Each fluidram represents 30 grains of Fraxinus Bark.

Anodynes and Analgesics.

Liquor Morphinae Hypodermicus.—"Magendie's Solution of Morphin."

Composition: Morphin Sulphate, 3.5 Gm.; Distilled Water, 100 Cc. Med. Properties: Narcotic. Uses: For the convenient administration of morphin by injection. Dose: 0.3 to 0.5 Cc. (5 to 8 minims), equal to about 0.008 to 0.016 Gm. (one-eighth to one-quarter grain) morphin sulphate.

Liquor Morphinae Citratis.—"Solution of Morphin Citrate."

Composition: Morphin (alkaloid), 3.5 Gm.; Citric Acid, 3 Gm.; Cochineal, 0.1 Gm.; Alcohol, 12.5 Cc.; Distilled Water, enough to make 100 Cc. Med. Properties: Narcotic. Uses: As a convenient form of prescribing morphin. Dose: 0.3 to 0.5 Cc. (5 to 8 minims), containing 0.008 to 0.016 Gm. (one-eighth to one-quarter grain) morphin citrate. Note: To be prepared as required.

Mistura Chloroformi et Cannabis Indicae Composita.—"Chloroform Anodyne."

Composition: Chloroform, Tincture of Indian Cannabis, Glycerin, of each 125 Cc.; Ether, 35 Cc.; Tincture of Capsicum, Water, of each 65 Cc.; Oil of Peppermint, 2 Cc.; Morphin Sulphate, 2.5 Gm.; Alcohol, enough to make 1,000 Cc. Med. Properties: Hypnotic, Antispasmodic, Anodyne. Uses: In colic, cramps, nervous excitement, etc. Dose: 1 to 4 Cc. (15 to 60 minims).

Pulvis Acetanilidi Compositus.—"Compound Acetanilid Powder."

Composition: Acetanilid, 50 Gm.; Caffein, 2 Gm.; Tartaric Acid, 3 Gm.; Sodium Bicarbonate, 45 Gm. Med. Properties: Antipyretic, Tonic. Uses: In nervous headaches. Dose: 0.3 to 1 Gm. (5 to 15 grains).

Antiperiodics.

Elixir Eucalypti.—"Elixir of Eucalyptus."

Composition: Fluid Extract of Eucalyptus, Alcohol, of each 125 Cc.; Syrup of Coffee, Compound Elixir of Taraxacum, of each 375 Cc. Med. Properties: Antiperiodic, Febrifuge, Stimulant. Uses: In fevers. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Extractum Cornus Circinatae Fluidum.—"Fluid Extract of Green Osier."

From the bark of Cornus circinata, L'Herit., with Diluted Alcohol. Med. Properties: Tonic, Antiperiodic. Uses: In malarial fevers. Dose: 1 to 4 Cc. (15 minims to 1 fluidram).

Mistura Splenetica.—"Gadberry's Mixture."

Composition: Sulphate of Iron, Quinin Sulphate, of each 14 Gm.; Nitric Acid, 14 Cc.; Potassium Nitrate, 42 Gm.; Water,

enough to make 1,000 Cc. Med. Properties: Antilithic, Antipyretic. Uses: In enlargement of the spleen. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Tinctura Antiperiodica.—"Warburg's Mixture."

1. Without Aloes: Rhubarb, Angelica (seed), of each 36 Gm.; Elecampane, Saffron, Fennel, of each 18 Gm.; Gentian, Zedoary, Cubeb, Myrrh, White Agaric, Camphor, of each 9 Gm.; Quinin sulphate, 100 Gm.; Diluted Alcohol, enough to make 1,000 Cc. 2. With Aloes: Extract of Aloes, 17.5 Gm.; Antiperiodic Tincture, 1,000 Cc. Med. Properties: Antiperiodic. Uses: In remittent and malarial fevers. Dose: 4 to 8 Cc. (1 to 2 fluidrams). Note: When "Warburg's Tincture," without any further specification, is prescribed, the preparation "with Aloes" is to be dispensed. "Warburg's Pills" (N. F.) have practically the same constituents as the tincture.

Antirheumatics and Antilithics.

Elixir Acidi Salicylici.—"Elixir of Salicylic Acid."

Composition: Salicylic Acid, 85 Gm.; Potassium Citrate, 125 Gm.; Glycerin, 500 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Antizymotic, Antipyretic, Antiperiodic. Uses: In rheumatism and gouty affections. Dose: 4 or 8 Cc. (1 or 2 fluidrams).

Elixir Sodii Salicylatis.—"Elixir of Sodium Salicylate."

Composition: Sodium Salicylate, 85 Gm.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Antizymotic, Antipyretic, Antiperiodic. Uses: In rheumatism, gout, neuralgia. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Elixir Lithii Citratis.—"Elixir of Lithium Citrate."

Composition: Lithium Citrate, 85 Gm.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Diuretic, Antilithic. Uses: In cystitis, gout, rheumatism. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Elixir Lithii Salicylatis.—"Elixir of Lithium Salicylate."

Composition: Lithium Salicylate, 85 Gm.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Antilithic, Anti pyretic, Diuretic, Diaphoretic. Uses: In rheumatism, gout, fevers, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Extractum Menyanthis Fluidum.—"Fluid Extract of Buckbean."

From the leaves of Menyanthes trifoliata, L., with Diluted Alcohol. Med. Properties: Tonic, Aperient, Emmenagogue, Antiscorbutic. Uses: In rheumatism, scrofula, scurvy. Dose: 1 to 4 Cc. (15 to 60 minims).

Pulvis Salis Vichyani Factitii Effervescens.—"Effervescent Artificial Vichy Salt."

Composition: 1,000 Gm. contain 240 Gm. of Artificial Vichy Salt (Form. 338). Med. Properties: Refrigerant, Diuretic, Antilithic. Uses: As a substitute for natural Vichy water. Dose: 4 to 8 Gm. (1 to 2 drams) in a glass of water.

Pulvis Salis Vichyani Factitii Effervescens cum Lithio.—"Effervescent Artificial Vichy Salt with Lithium."

Composition: 1,000 Gm. contain 156 Gm. of Artificial Vichy Salt (Form. 338) and 56 Gm. of Lithium Citrate. Med. Properties: Anti-

lithic, Diuretic, Refrigerant. Uses: As a substitute for natural Vichy water. Dose: 4 to 8 Gm. (1 to 2 drams) in a glass of water.

Sal Vichyanum Factitium.—"Artificial Vichy Salt."

Composition: Sodium Bicarbonate, 846 Gm.; Potassium Carbonate, 38.5 Gm.; Magnesium Sulphate (anhydrous), 38.5 Gm.; Sodium Chlorid, 77 Gm. Med. Properties: Diuretic, Antilithic, refrigerant. Uses: As a substitute for the natural Vichy salt. Note: A solution of 1 Gm. (15 grains) dissolved in 180 Cc. (6 fluidounces) of water, about corresponds to an equal volume of Vichy water ("Grande Grille").

Sodii Boro-Benzoas.—"Boro-Benzoate of Sodium."

Composition: Sodium Borate, 3 parts; Sodium Benzoate, 4 parts. Med. Properties: Antiseptic, Antilithic, Diuretic. Uses: In fevers, saltrheum, gravel. Dose: 1 to 4 Gm. (15 to 60 grains).

Extractum Boldi Fluidum.—"Fluid Extract of Boldo."

From the leaves of Peumus Boldus, Mol., with a mixture of 2 volumes of Alcohol and 1 volume of Water. Med. Properties: Tonic, Cholagogue, Stimulant. Uses: In rheumatism, hepatic torpor, dyspepsia, etc. Dose: 0.3 to 0.6 Cc. (5 to 10 minims).

ANTISEPTICS, LOTIONS, STYPTICS, ETC.

Acetum Aromaticum.—"Aromatic Vinegar."

Composition: Oil of Lavender, Oil of Rosemary, Oil of Juniper, Oil of Peppermint, Oil of Cinnamon, of each 0.5 Cc.; Oil of Lemon, Oil of Cloves, of each 1 Cc,; Alcohol, Acetic Acid, of each 175 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Antizymotic. Uses: Locally, as a wash and for inhalation.

Aqua Hamamelidis Spirituosa.—"Witch-hazel Extract."

Composition: 100 Cc. contain the volatile constituents obtained by distillation of 100 Gm. of the fresh young twigs of Hamamelis and 15 Cc. of Alcohol with 200 Cc. of Water. Med. Properties: Venous Tonic and Sedative. Uses: Locally as embrocation, wash, etc.

Boroglycerinum.—"Boroglycerid."

Composition: Boric Acid, 620 Gm.; Glycerin, 920 Gm. Reduced, by heating at not exceeding 150 deg. C., to 1,000 Gm. Med. Properties: Antiseptic. Use: Locally, and for the convenient preparation of the official Glyceritum Boroglycerini.

Ceratum Camphorae Compositum.—"Camphor Ice."

Composition: Camphor, 107 Gm.; White Wax, 150 Gm.; Castor Oil, 250 Gm.; Spermaceti, 480 Gm.; Carbolic Acid, 2 Gm.; Oil of Bitter Almond, 1 Gm.; Benzoic Acid, 10 Gm. Med. Properties: Stimulant and Antiseptic Emollient. Use: Locally, as a dressing for chapped surfaces.

Collodium Iodatum.—"Iodized Collodion."

Composition: Iodin, 5 Gm.; Flexible Collodion, 95 Gm. Med. Properties and Uses: Locally, as a counter-irritant and for the constitutional effects of iodin.

Collodium Iodoformatum.—"Iodoform Collodion."

Composition: Iodoform, 5 Gm.; Flexible Collodion, 95 Gm. Med. Properties and Uses: Locally, as a stimulant and antiseptic with anesthetic properties.

Iodoformum Aromatisatum.—"Deodorized Iodoform."

Composition: Iodoform, 96 Gm.; Coumarin, 4 Gm. Uses: As an agreeable substitute for iodoform.

Liquor Alumini Acetatis.—"Solution of Aluminum Acetate."

Composition: Aluminum Sulphate, Acetic Acid, of each 300 Gm.; Calcium Carbonate, 130 Gm.; Water, 1,000 Cc. (Note: The finished product contains from 7.5 to 8 per cent of basic Aluminum Acetate.) Med. Properties: Astringent, Antiseptic. Uses: Internally, in diarrhea and dysentery; externally, to putrid sores and skin affections. Dose: 0.2 to 1 Cc. (3 to 15 minims).

Liquor Alumini Acetico-Tartratis.—"Solution of Acetico-Tartrate of Aluminum."

Composition, Alum, 750 Gm.; Sodium Carbonate, 700 Gm.; Glacial Acetic Acid, 150 Gm.; Tartaric Acid, 135 Gm.; Water, enough to make 1,000 Gm. (Note: The finished solution contains about 50 per cent of dry, so-called Aluminum Acetico-Tartrate.) Med. Properties: Astringent and Antiseptic. Uses: Locally, in skin diseases and as disinfectant.

Liquor Bromi.—"Smith's Solution of Bromin."

Composition: Bromin, 25 Gm.; Potassium Bromid, 12.5 Gm.; Water, 100 Cc. Med. Properties: Antiseptic. Uses: Locally, as an application in gangrene and putrid sores.

Liquor Iodi Carbolatus.—"Boulton's Solution."

Composition: Compound Tincture of Iodin, 15 Cc.; Carbolic Acid, 5.5 Cc.; Glycerin, 165 Cc.; Water, enough to make 1,000 Cc. (exposed to sun until colorless). Med. Properties: Antiseptic, Irritant. Uses: Locally, in glandular enlargements, etc.

Liquor Iodi Causticus.—"Churchill's Iodin Caustic."

Composition: Iodin, 25 Gm.; Potassium Iodid, 50 Gm.; Water, 100 Cc. Med. Properties: Counter-irritant, Antiseptic. Uses: Locally, in erysipelas, rheumatism, ulcers of the uterus, etc.

Liquor Ferri Oxysulphatis.—"Solution of Oxysulphate of Iron."

Composition: The product from Iron Sulphate, Nitric Acid, of each 165 Gm.; Distilled Water, enough to make 1,000 Cc. Med. Properties: Astringent, Hemostatic. Uses: Locally, as a styptic.

Liquor Picis Alkalinus.—"Alkaline Solution of Tar."

Composition: Tar, 250 Gm.; Potassa, 125 Gm.; Water, 625 Cc. Med. Properties: Stimulant, Caustic. Uses: Locally, in various skin diseases.

Liquor Potassae Chloratae.—"Javelle Water."

Composition: Chlorinated Lime, 80 Gm.; Potassium Carbonate 58 Gm.; Water, enough to make 1,000 Cc. Med. Properties: Antiseptic, Disinfectant. Uses: Locally, as a gargle in putrid sore throat, etc.

Liquor Sodii Carbolatis.—"Phenol Sodique."

Composition: Carbolic Acid, 50 Gm.; Soda, 3.5 Gm.; Water, 46.5 Gm. Med. Properties: Antiseptic. Uses: As a disinfectant, both general and, diluted, as a wash.

Liquor Sodii Boratis Compositus.—"Dobell's Solution."

Composition: Sodium Borate, Sodium Bicarbonate, of each 15 Gm.; Carbolic Acid, 3 Gm.; Glycerin, 35 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Antiseptic. Uses: Locally, as a spray or gargle in affections of the throat and nose.

Liquor Zinci et Alumini Compositus.—"Compound Solution of Zinc and Aluminum."

Composition: Zinc Sulphate, Aluminum Sulphate, of each 1,000 Gm.; Naphthol, 3 Gm.; Oil of Thyme, 10 Cc.; Water, enough to make 5,000 Cc. Med. Properties: Antiseptic, Deodorant, Astringent. Uses: Locally, diluted, as a wash, and as a general disinfectant.

Liquor Zinci et Ferri Compositus.—"Deodorant Solution."

Composition: Zinc Sulphate, Ferrous Sulphate, of each 1,000 Gm.; Copper Sulphate, 325 Gm.; Naphthol, 3 Gm.; Oil of Thyme, 10 Cc.; Diluted Hypophosphorous Acid, 20 Cc.; Water, enough to make 5,000 Cc. Med. Properties: Deodorant, Antiseptic, Astringent. Uses: Locally, diluted, as a wash, and as a general disinfectant.

Lotio Adstringens.—"Warren's Styptic."

Composition: Sulphuric Acid, 38 Cc.; Oil of Turpentine, Water, of each 31 Cc. Med. Properties: Astringent, Styptic, Rubefacient. Uses: Locally, in bleeding ulcers, gangrene, etc.

Lotio Flava.—"Yellow Wash."

Composition: Corrosive Chlorid of Mercury, 3 Gm.; Boiling Water, 35 Cc.; Lime Water, enough to make 1,000 Cc. Med. Properties: Antiseptic, Parasiticide. Uses: In syphilitic affections.

Lotio Nigra.—"Black Wash."

Composition: Mild Chlorid of Mercury, 7.5 Gm.; Water, 35 Cc.; Lime Water, enough to make 1,000 Cc. Med. Properties: Antiseptic, Parasiticide. Uses: In syphilitic affections.

Lotio Plumbi et Opii.—"Lead and Opium Wash."

Composition: Lead Acetate, 17.5 Gm.; Tincture of Opium, 35 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Astringent, Sedative, Antiseptic. Uses: Locally in contusions, bruises, rheumatism, gout.

Mistura Oleo-Balsamica.—"Balsamum Vitae Hoffmanni."

Composition: Oil of Lavender, Oil of Thyme, Oil of Lemon, Oil of Mace, Oil of Orange Flowers, of each 4 Cc.; Oil of Cloves, Oil of Cinnamon, of each 3.5 Cc.; Balsam of Peru, 10.5 Cc.; Alcohol, enough to make 1,000 Cc. Med. Properties: Antiseptic. Uses: Locally, as a vulnerary.

Mistura Adstringens et Escharotica.—"Villate's Solution."

Composition: Solution of Lead Subacetate, 100 Cc.; Copper Sulphate, Zinc Sulphate, of each, 65 Gm.; Diluted Acetic Acid, 850 Cc. Med. Properties: Astringent, Antiseptic, Caustic. Uses: Locally, in the treatment of ulcer, gangrene, etc.

Pulvis Anticatarrhalis.—"Catarrh Snuff."

Composition: Morphin Hydrochlorate, 0.41 Gm.; Acacia, 25 Gm.; Bismuth Subnitrate, 75 Gm. Med. Properties and Uses: Indicated by title.

Pulvis Iodoformi Compositus.—"Iodoform and Naphthalin."

Composition: Iodoform, 20 Gm.; Boric Acid, 30 Gm.; Naphthalin, 50 Gm.; Oil of Bergamot, 2.5 Cc. Med. Properties: Antiseptic. Uses: As a dusting powder on wounds, ulcers, etc.

Pulvis Talci Salicylicus.—"Salicylated Talcum Powder."

Composition: Salicylic Acid, 30 Gm.; Boric Acid, 100 Gm.; Talcum, 870 Gm. Med. Properties: Antiseptic, Protective. Uses: Locally, as a dusting powder.

Spiritus Odoratus (U. S. P. 1880).—"Cologne Water."

Composition: Oil of Bergamot, 15 Cc.; Oil of Lemon, 8 Cc.; Oil of Rosemary, 7 Cc.; Oil of Lavender Flowers, Oil of Orange Flowers, of each 4 Cc.; Acetic Ether, 2 Cc.; Water, 120 Cc.; Alcohol, 840 Cc. Med. Properties: Antispasmodic, Antiseptic. Uses: Mainly as a refreshing inhalant and perfume.

Tinctura Iodi, Churchill.—"Churchill's Tincture of Iodin."

Composition: Iodin, 165 Gm.; Potassium Iodid, 33 Gm.; Water, 250 Cc.; Alcohol, enough to make 1,000 Cc. Med. Properties: Antiseptic, Counter-irritant. Uses: Locally, on ulcers.

Tinctura Iodi Decolorata.—"Decolorized Tincture of Iodin."

Composition: Iodin, 83 Gm.; Sodium Hyposulphite, 83 Gm.; Water, 100 Cc.; Stronger Water of Ammonia, 65 Cc.; Alcohol, enough to make 1,000 Cc. Med. Properties: Antiseptic, Counter-irritant. Uses: Locally, to disperse suppurations, etc.

Astringents—Diarrhea and Dysentery.

Cordiale Rubi Fructus.—"Blackberry Cordial."

Composition: Blackberry Juice, 1,875 Cc.; Cinnamon, 100 Gm.; Cloves, Nutmeg, of each 25 Gm.; Syrup, 1,875 Cc.; Diluted Alcohol, enough to make 5,000 Cc. Med. Properties: Aromatic, Astringent, Carminative. Uses: In diarrhea and similar bowel complaints. Dose: 15 to 30 Cc. (one-half to one fluidounce).

Elixir Rubi Compositum.—"Compound Elixir of Blackberry."

Composition: Blackberry Root, Galls, Saigon Cinnamon, of each 160 Gm.; Cloves, 40 Gm.; Mace, Ginger, of each 20 Gm.; Blackberry Juice, 3,750 Cc.; Syrup, Glycerin, of each 1,875 Cc.; Diluted Alcohol, enough to make 10,000 Cc. Med. Properties: Stomachic Astringent. Uses: In summer complaint of children, diarrhea, dysentery. Dose: 2 to 16 Cc. (one-half to four fluidrams). Note: Not to be confounded with "Blackberry Cordial."

Extractum Cornus Fluidum.—"Fluid Extract of Dogwood."

From the bark of the root of Cornus Florida, L., with a mixture of Glycerin, 150; Diluted Alcohol, 850 volumes. Med. Properties: Tonic, Astringent, Antiperiodic. Uses: In diarrhea, dyspepsia, malaria. Dose: 2 to 4 Cc. (one-half to one fluidram).

Extractum Coto Fluidum.—"Fluid Extract of Coto."

From "Coto" bark (botanical source undetermined), with a mixture of 9 volumes of Alcohol and 1 volume of Water. Med. Proper-

ties: Astringent, Spinal Stimulant, Carminative. Uses: In chronic diarrhea. Dose: 0.2 to 0.3 Cc. (3 to 20 minims).

Mistura Camphorae Acida.—"Hope's Mixture."

Composition: Nitric Acid, 17.5 Cc.; Tincture of Opium, 12 Cc.; Camphor Water, enough to make 1,000 Cc. Med. Properties: Astringent, Sedative. Uses: In diarrhea and dysentery. Dose: 4 to 8 Cc. (one to two fluidrams).

Mistura Camphorae Aromatica.—"Parrish's Camphor Mixture."

Composition: Compound Tincture of Lavender, 250 Cc.; Sugar, 35 Gm.; Camphor Water, enough to make 1,000 Cc. Med. Properties: Aromatic, Carminative, Astringent, Sedative. Uses: In diarrhea, dysentery. Dose: 4 or 8 Cc. (one to two fluidrams).

Mistura Contra Diarrhoeam.—"Cholera Mixture."

Composition: Tincture of Opium, Tincture of Capsicum, Tincture of Rhubarb, Spirit of Camphor, Spirit Peppermint, of each 20 Cc. Med. Properties: Sedative, Antispasmodic, Carminative. Uses: In diarrhea, colic, cholera, etc. Dose: 1 to 4 Cc. (15 to 60 minims).

Mistura Sulphurica Acida.—"Haller's Acid Elixir."

Composition: Sulphuric Acid, 250 Gm.; Alcohol, enough to make 1,000 Gm. Med. Properties: Antiscorbutic, Astringent. Uses: In scurvy, intestinal disorders, night-sweats. Dose: 0.6 to 1.25 Cc. (10 to 20 minims).

Pilulae Opii et Camphorae.—"Pills of Opium and Camphor."

Composition: Opium, powdered, 1 gr.; Camphor, 2 gr.

Pilulae Opii et Plumbi.—"Pills of Opium and Lead."

Composition: Opium, powdered, 1 gr.; Lead Acetate, 1 gr.

Pulvis Catechu Compositus.—"Compound Powder of Catechu."

Composition: Catechu, 40 Gm.; Kino, Krameria, of each 20 Gm.; Cinnamon, Nutmeg, of each 10 Gm. Med. Properties: Aromatic Astringent. Uses: In diarrhea and dysentery. Dose: 0.65 to 4 Gm. (10 to 60 grains).

Pulvis Cretae Aromaticus.—"Aromatic Chalk Powder."

Composition: Cinnamon, 8 Gm.; Saffron, Nutmeg, of each 6 Gm.; Cloves, 3 Gm.; Cardamon, 2 Gm.; Prepared Chalk, 23 Gm.; Sugar, 52 Gm. Med. Properties: Aromatic, Antacid. Uses: In diarrhea. Dose: 2 to 4 Gm. (30 to 60 grains).

Pulvis Cretae Aromaticus cum Opio.—"Aromatic Chalk Powder with Opium."

Composition: Aromatic Chalk Powder, 97.5 Gm.; Powdered Opium, 2.5 Gm. Med. Properties: Sedative, Aromatic, Antacid. Uses: In diarrhea. Dose: 0.65 to 2 Gm. (10 to 30 grains).

Pulvis Kino Compositus.—"Compound Kino Powder."

Composition: Kino, 75 Gm.; Powdered Opium, 5 Gm.; Cinnamon, 20 Gm. Med. Properties: Astringent, Sedative, Aromatic. Uses: In gastric intestinal affections, diarrhea. Dose: 0.3 to 1.25 Gm. (5 to 20 grains).

Pulvis Myricae Compositus.—"Composition Powder."

Composition: Bayberry (root-bark), 60 Gm.; Ginger, 30 Gm.; Capsicum, Cloves, of each 5 Gm. Med. Properties: Astringent, Aro-

matic, Stimulant. Uses: In colic, diarrhea, etc. Dose: 0.6 to 2 Gm. (10 to 30 grains).

Syrupus Rubi Aromaticus.—"Aromatic Syrup of Blackberry."

Composition: Blackberry Bark, 125 Gm.; Cinnamon, Nutmeg, of each 15 Gm.; Cloves, Allspice, of each 8 Gm.; Sugar, 650 Gm.; Diluted Alcohol, Blackberry Juice, of each enough to make 1,000 Cc. Med. Properties: Aromatic, Astringent. Uses: In diarrhea, dysentery, etc. Dose: 4 to 8 Cc. (one to two fluidrams).

Tinctura Cota.—"Tincture of Coto."

Composition: Coto Bark, 125 Gm.; Alcohol, enough to make 1,000 Cc. Med. Properties: Astringent, Spinal Stimulant. Uses: In diarrhea. Dose: 4 to 8 Cc. (one to two fluidrams).

Tinctura Kino Composita.—"Compound Tincture of Kino."

Composition: Tincture of Kino, 100 Cc.; Tincture of Opium, 100 Cc.; Spirit of Camphor, 65 Cc.; Oil of Cloves, 1.5 Cc.; Cochineal, 9 Gm.; Aromatic Spirit of Ammonia, 8 Cc.; Diluted Alcohol, enough to make 1,000 Cc. Med. Properties: Sedative, Astringent. Uses: In diarrhea. Dose: 4 to 8 Cc. (one to two fluidrams).

Carminatives, Stomachics and Digestives.

Elixir Anisi.—"Anise Cordial."

Composition: Anethol, 3.5 Cc.; Oil of Fennel, 0.5 Cc.; Spirit of Bitter Almond, 12 Cc.; Deodorized Alcohol, 240 Cc.; Syrup, 625 Cc.; Water, 125 Cc. Med. Properties: Mild Carminative. Uses: In infantile stomach and bowel affections, and as an adjuvant elixir. Dose: For infants 1 to 4 Cc. (15 minims to one fluidram).

Elixir Bismuth.—"Elixir of Bismuth."

Composition: Bismuth and Ammonium Citrate, 35 Gm.; Water, 60 Cc.; Ammonia Water, enough for solution; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Sedative, Stomachic, Astringent. Uses: In diarrhea, gastritis and similar stomachic disturbances.

Elixir Digestivum Compositum.—"Compound Elixir of Pepsin."

Composition: Pepsin, 10 Gm.; Pancreatin, Diastase, of each 1 Gm.; Lactic Acid, 3 Gm.; Hydrochloric Acid, 6 Cc.; Tincture of Cudbear, 15 Cc.; Water, 125 Cc.; Glycerin, 250 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Proteolytic. Uses: In dyspepsia, malnutrition, etc. Dose: 4 to 16 Cc. (one to four fluidrams).

Elixir Pepsini.—"Elixir of Pepsin."

Composition: Pepsin, 17.5 Gm.; Hydrochloric Acid, 4 Cc.; Glycerin, 125 Cc.; Compound Elixir of Taraxacum, 65 Cc.; Alcohol, 175 Cc.; Sugar, 250 Gm.; Water, enough to make 1,000 Cc. Med. Properties: Proteolytic. Uses: In impaired digestion. Dose: 4 to 16 Cc. (one to four fluidrams).

Elixir Pepsini, Bismuthi et Strychninae.—"Elixir of Pepsin, Bismuth and Strychnin."

Composition: Strychnin Sulphate, 0.175 Gm.; Elixir of Pepsin and Bismuth, enough to make 1,000 Cc. Med. Properties: Proteolytic, Astringent and Tonic. Uses: In impaired digestion attended by diarrhea; malnutrition and debility. Dose: 4 to 8 Cc. (one to two fluidrams).

Elixir Pepsini et Bismuthi.—"Elixir of Pepsin and Bismuth."

Composition: Pepsin, 17.5 Gm.; Bismuth and Ammonium Citrate, 35 Gm.; Glycerin, 125 Cc.; Alcohol, 175 Cc.; Syrup, 250 Cc.; Compound Elixir of Taraxacum, 65 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Proteolytic and Astringent. Uses: In impaired digestion attended by diarrhea. Dose: 4 or 8 Cc. (one or two fluidrams).

Elixir Pepsini et Ferri.—"Elixir of Pepsin and Iron."

Composition: Tincture of Citro-chlorid of Iron, 75 Cc.; Elixir of Pepsin, 925 Cc. Med. Properties: Proteolytic, Tonic and Astringent. Uses: In impaired digestion, attended by anemia. Dose: 4 to 8 Cc. (one to two fluidrams).

Extractum Angelicae Radicis Fluidum.—"Fluid Extract of Angelica Root."

From the root of Angelica Archangelica, L., with a mixture of 3 volumes of Alcohol and 2 volumes of Water. Med. Properties: Carminative, Aromatic, Stimulant. Uses: In dyspepsia, flatulence, etc. Dose: 2 to 4 Cc. (one-half to one fluidram).

Glyceritum Pepsini.—"Glycerite of Pepsin."

Composition: Pepsin (U. S. P.), 85 Gm.; Hydrochloric Acid, 10 Cc.; Glycerin, 500 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Proteolytic. Uses: In dyspepsia. Dose: 4 to 8 Cc. (one to two fluidrams).

Liquor Bismuthi.—"Liquid Bismuth."

Composition: Glycerite of Bismuth (Form. 185), Alcohol, of each 125 Cc.; Water, 750 Cc. Med. Properties: Astringent. Uses: In dyspepsia, diarrhea, etc. Dose: 4 to 8 Cc. (one to two fluidrams).

Liquor Pancreaticus.—"Pancreatic Solution."

Composition: Pancreatin, 17.5 Gm.; Sodium Bicarbonate, 50 Gm.; Glycerin, 250 Cc.; Compound Spirit of Cardamom, Alcohol, of each 35 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Amylolytic, Proteolytic, Emulsificant. Uses: As a digestive agent. Dose: 4 to 8 Cc. (one to two fluidrams).

Liquor Pepsini (U. S. P. 1880).—"Liquid Pepsin."

Composition: Saccharated Pepsin, 40 Gm.; Hydrochloric Acid, 12 Gm.; Glycerin, 325 Cc.; Water, 650 Cc. Med. Properties: Proteolytic. Uses: To assist and promote digestion. Dose: 4 to 8 Cc. (one to two fluidrams).

Liquor Pepsini Aromaticus.—"Aromatic Solution of Pepsin."

Composition: Pepsin, 17.5 Gm.; Oil of Cinnamon, Oil of Pimenta, of each 4 drops; Oil of Cloves, 8 drops; Alcohol, 35 Cc.; Hydrochloric Acid, 10 Cc.; Glycerin, 250 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Proteolytic. Uses: To assist and promote digestion. Dose: 4 to 8 Cc. (one to two fluidrams).

Liquor Seriparus.—"Liquid Rennet."

Composition: Fresh Calves' Rennet, 100 Gm.; Sodium Chlorid, 40 Gm.; Alcohol, 200 Cc.; Water, 800 Cc. Uses: For coagulating milk. Note: One part of this liquid should coagulate between 200 and 300 parts of cow's milk.

Mistura Carminativa.—"Dalby's Carminative."

Composition: Magnesium Carbonate, 65 Gm.; Potassium Carbonate, 3 Gm.; Tincture of Opium, 25 Cc.; Oil of Caraway, Oil of

Fennel, Oil of Peppermint, of each 0.5 Cc.; Syrup, 160 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Carminative. Uses: In colic of infants. Dose: For infants 0.5 to 2 Cc. (8 to 30 minims).

Mistura Magnesiae et Asafoetidae (U. S. P. 1880).—"Dewees' Carminative."

Composition: Magnesium Carbonate, 50 Gm.; Tincture of Asafetida, 75 Cc.; Tincture of Opium, 10 Cc.; Sugar, 100 Gm.; Distilled Water, enough to make 1,000 Cc. Med. Properties: Carminative, Antispasmodic. Uses: In colic of infants. Dose: For infants 0.3 to 2 Cc. (5 to 30 minims).

Mistura Sassafras et Opii.—"Godfrey's Cordial."

Composition: Oil of Sassafras, 1 Cc.; Potassium Carbonate, 8 Gm.; Tincture of Opium, 35 Cc.; Alcohol, 50 Cc.; Molasses, 325 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Sedative, Carminative. Uses: In abdominal pains, flatulence and bowel disorders of children. Dose: For children 1 to 4 Cc. (15 to 60 minims), according to age.

Mistura Sodae et Menthae.—"Soda Mint."

Composition: Sodium Bicarbonate, 50 Gm.; Aromatic Spirit of Ammonia, 10 Cc.; Spearmint Water, enough to make 1,000 Cc. Med. Properties: Carminative, Antacid, Diuretic. Uses: In heartburn, flatulence, indigestion. Dose: 4 to 16 Cc. (one to four fluidrams).

Pepsinum Aromaticum.—"Aromatic Pepsin."

Composition: Saccharated Pepsin, 97 Gm.; Aromatic Fluid Extract, 6 Cc.; Tartaric Acid, Sodium Chlorid, of each 1.5 Gm. Med. Properties: Proteolytic. Uses: In dyspepsia and indigestion. Dose: 1 to 2 Gm. (15 to 30 grains).

Pilulae Antidyspepticae.—"Anti-dyspeptic Pills."

Composition: Strychnin (alkaloid), $^1/_{40}$ gr.; Ipecac, $^1/_{10}$ gr.; Alcoholic Extract of Belladonna Leaves, $^1/_{10}$ gr.; Mass of Mercury, 2 gr.; Compound Extract of Colocynth, 2 gr.

Pulvis Pancreaticus Compositus.—"Peptonizing Powder."

Composition: Pancreatin, 20 Gm.; Sodium Bicarbonate, 80 Gm. Med. Properties: Proteolytic, Amylolytic. Uses: For peptonizing milk. Note: 1.67 Gm. (25 grains) dissolved in 120 Cc. 4 fluidounces) of tepid water are used for 500 Cc. (1 pint) of fresh cows' milk, previously heated to 38° C. (104° F.), and so maintained during 30 minutes in a suitable flask.

Pulvis Pepsini Compositus.—"Pulvis Digestivus."

Composition: Saccharated Pepsin, Pancreatin, of each 15 Gm.; Diastase, 1 Gm.; Lactic Acid, 1 Cc.; Hydrochloric Acid, 2 Cc.; Sugar of Milk, 66 Gm. Med. Properties: Proteolytic. Uses: In dyspepsia. Dose: 1 to 2 Gm. (15 to 30 grains).

Succus Limonis cum Pepsino.—"Lime Juice and Pepsin."

Composition: Pepsin, 35 Gm.; Water, Glycerin, of each 175 Cc.; Alcohol, 90 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Proteolytic. Uses: In dyspepsia and indigestion. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Tinctura Amara.—"Stomach Drops."

Composition: Gentian, Centaury, of each 50 Gm.; Bitter Orange Peel, 35 Gm.; Orange Berries, Zedoary, of each 17 Gm.; Alcohol, 2

vol., Water 1 vol., enough to make 1,000 Cc. Med. Properties: Tonic, Stomachic. Uses: For indigestion and dyspepsia. Dose: 2 to 4 Cc. (one-half to one fluidram).

Tinctura Aromatica.—"Aromatic Tincture."

Composition: Cinnamon, 85 Gm.; Ginger, 36 Gm.; Galangal, Cloves, Cardamon, of each 18 Gm.; Alcohol, 2 vols., Water, 1 vol., enough to make 1,000 Cc. Med. Properties: Carminative. Uses: In colic, and as adjuvant to antispasmodic and diarrhea mixture. Dose: 1 to 4 Cc. (15 to 60 minims).

Tinctura Capsici et Myrrhae.—"Hot Drops."

Composition: Capsicum, 32 Gm.; Myrrh, 125 Gm.; Alcohol, 9 vols., Water, 1 vol., enough to make 1,000 Cc. Med. Properties: Carminative, Antispasmodic. Uses: In colic and cramps. Dose: 2 to 4 Cc. (one-half to one fluidram).

Tinctura Pectoralis.—"Bateman's Pectoral Drops."

Composition: Tincture of Opium, 42 Cc.; Compound Tincture of Catechu, 30 Cc.; Spirit of Camphor, 40 Cc.; Oil of Anise, 1 Cc.; Caramel, 16 Cc.; Diluted Alcohol, enough to make 1,000 Cc. Med. Properties: Sedative. Uses: In infantile complaints. Dose: 1 to 4 Cc. (15 to 60 minims) or more, according to age.

Tinctura Zedoariae Amara.—"Bitter Tincture of Zeodary."

Composition: Zedoary Root, 250 Gm.; Aloes, 125 Gm.; Rhubarb, Gentian, White Agaric, Saffron, of each 62 Gm.; Glycerin, 125 Cc.; Alcohol, 2 vols., Water, 1 vol., enough to make 1,000 Cc. Med. Properties: Tonic, Aperient, Stomachic. Uses: In indigestion, dyspepsia, etc. Dose: 2 to 8 Cc. (one-half to two fluidrams).

Trochisci Magnesiae (U. S. P. 1880).—"Magnesia Troches."

Composition: Magnesia, 19.50 Gm.; Nutmeg, 1 Gm.; Sugar, 58.5 Gm.; Mucilage of Tragacanth, enough to make 100 Troches. Med. Properties: Antacid, Aperient. Uses: In heartburn, dyspepsia, etc. Dose: One, two or more, according to circumstances.

Vinum Pepsini.—"Wine of Pepsin."

Composition: Pepsin, 17.5 Gm.; Glycerin, 50 Cc.; Hydrochloric Acid, 4 Cc.; Water, 60 Cc.; Stronger White Wine, enough to make 1,000 Cc. Med. Properties: Proteolytic. Uses: In dyspepsia. Dose: 4 to 8 Cc. (one to two fluidrams).

Diaphoretics and Diuretics.

Elixir Buchu.—"Elixir of Buchu."

Composition: Fl. Ext. Buchu, 125 Cc.; Alcohol, Syrup, of each 62 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Gastric Stimulant and Diuretic. Uses: In catarrhal affections of the bladder and urethra, gravel, incontinence of urine, etc. Dose: 4 to 16 Cc. (one to four fluidrams).

Elixir Buchu Compositum.—"Compound Elixir of Buchu."

Composition: Comp. Fl. Ext. Buchu (Form. 144), 250 Cc.; Alcohol, Syrup, of each 62 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Gastric Stimulant and Diuretic. Uses: In affections of the Urinary Organs. Dose: 4 to 8 Cc. (one to two fluidrams).

Elixir Buchu et Potassii Acetatis.—"Elixir of Buchu and Potassium Acetate."

Composition: Potassium Acetate, 85 Gm.; Elixir of Buchu, enough to make 1,000 Cc. Med. Properties: Diuretic and Antilithic. Uses: In various diseases of the Urinary Organs. Dose: 4 to 8 Cc. (one to two fluidrams).

Elixir Pilocarpi.—"Elixir of Jaborandi."

Composition: Fluid Extract of Jaborandi, 65 Cc.; Tincture of Vanilla, 35 Cc.; Syrup of Coffee, 200 Cc.; Compound Elixir of Taraxacum, 700 Cc. Med. Properties: Diaphoretic, Sialagogue and Diuretic. Uses: In dropsy, coryza, nephritis, pleurisy, rheumatism, etc. Dose: 4 to 8 Cc. (one to two fluidrams).

Elixir Potassii Acetatis.—"Elixir of Potassium Acetate."

Composition: Potassium Acetate, 85 Gm.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Diuretic, Antipyretic, Antacid. Uses: In dropsy, cystitis, fevers, rheumatism, gout. Dose: 4 to 16 Cc. (one to four fluidrams).

Elixir Potassii Acetatis et Juniperi.—"Elixir of Potassium Acetate and Juniper."

Composition: Potassium Acetate, 85 Gm.; Fluid Extract of Juniper Berries, 125 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Diuretic, Antipyretic, Emmenagogue. Uses: In cystitis, nephritis and diseases of the genito-urinary organs. Dose: 4 to 16 Cc. (one to four fluidrams).

Extractum Apii Graveolentis Fluidum.—"Fluid Extract of Celery."

From the seed of Apium graveolens, L., with a mixture of a volume of Alcohol and 1 volume of Water. Med. Properties: Diuretic, Antispasmodic. Uses: In dropsy, Bright's Disease, etc. Dose: 4 to 8 Cc. (one to two fluidrams).

Extractum Buchu Fluidum Compositum.—"Compound Fluid Extract of Buchu."

From a mixture of Buchu, 625 Gm.; Cubeb, Juniper, Uva Ursi, of each 125 Gm.; with a mixture of 2 volumes of Alcohol and 1 volume of Water. Med. Properties: Diuretic and Diaphoretic. Uses: In diseases of the kidneys, bladder, etc. Dose: 2 to 4 Cc. (one-half to one fluidram).

Extractum Hydrangeae Fluidum.—"Fluid Extract of Seven Barks."

From the root of Hydrangea arborescens, L., with a mixture of 3 volumes of Alcohol and 2 volumes of Water. Med. Properties: Diuretic, Antilithic, Cathartic. Uses: In dropsy, general urinary diseases and hepatic disorders. Dose: 2 to 4 Cc. (30 to 60 minims).

Extractum Juniperi Fluidum.—"Fluid Extract of Juniper."

From the fruit of Juniperus communis, L., with Diluted Alcohol. Med. Properties: Antiseptic, Diuretic and Stimulant. Uses: In catarrh of the bladder, gonorrhea, etc. Dose: 4 or 8 Cc. (one to two fluidrams).

Extractum Kavae Fluidum.—"Fluid Extract of Kava-Kava."

From the root of Piper methysticum, Forst, with a mixture of 3 volumes of Alcohol and 2 volumes of Water. Med. Properties: Diuretic, Alterative, Sedative, Tonic. Uses: In catarrhal affections of the urinary organs, in gout and rheumatism. Dose: 1 to 4 Cc. (15 to 60 minims).

Extractum Petroselini Radicis Fluidum.—"Fluid Extract of Parsley."

From the root of Petroselinum sativum, Hoff, with Diluted Alcohol. Med. Properties: Diuretic, Aperient, Alterative, Antiperiodic. Uses: In dropsy, amenorrhea, derangement of the urinary tract. Dose: 2 to 4 Cc. (one-half to one fluidram).

Emulsio Olei Terebinthinae.—"Emulsion of Oil of Turpentine."

Composition: Oil of Turpentine, 12.5 Cc.; Acacia, 2 Gm.; Yolk of Egg, 15 Cc.; Aromatic Elixir, 15 Cc.; Cinnamon Water, enough to make 100 Cc. Med. Properties: Stimulant, Diuretic, Anthelmintic. Uses: In fevers, rheumatic affections, catarrh of the bladder, stomach worms, etc. Dose: 2 to 8 Cc. (one-half to two fluidrams).

Extractum Urticae Fluidum.—"Fluid Extract of Nettle."

From the root of Urtica dioica, L., with Diluted Alcohol. Med. Properties: Diuretic, Tonic, Astringent. Uses: In nephritis, gravel, uterine hemorrhage. Dose: 1 to 2 Cc. (15 to 30 minims).

Mistura Copaibae Composita.—"Lafayette Mixture."

Composition: Copaiba, Spirit of Nitrous Ether, Compound Tincture of Lavender, of each 125 Cc.; Solution of Potassa, 35 Cc.; Syrup, 325 Cc.; Mucilage of Dextrin, enough to make 1,000 Cc. Med. Properties: Antiseptic, Diuretic. Uses: In gonorrhea. Dose: 4 to 8 Cc. (one to two fluidrams). Note: A formula is also given for "Chapman's Mixture," which contains twice as much Copaiba and a little Tincture of Opium, but in other essentials is the same.

Tinctura Pimpinellae.—"Tincture of Pimpinella."

Composition: Pimpinella Root, 165 Gm.; Alcohol, 2 vols., Water, 1 vol., enough to make 1,000 Cc. Med. Properties: Diaphoretic, Diuretic, Tonic. Uses: In dropsy, amenorrhea, chronic catarrh. Dose: 4 to 8 Cc. (one to two fluidrams).

Expectorants and Cough Mixtures.

Acetum Lobeliae (U. S. P. 1880).—"Vinegar of Lobelia."

Composition: Lobelia, 100 Gm.; Dil. Acetic Acid, enough to make 1,000 Cc. Med. Properties: Nauseating Expectorant, Antispasmodic. Uses: In spasmodic asthma, bronchitis and coughs. Dose: 2 to 4 Cc. (one-half to one fluidram).

Acetum Sanguinariae (U. S. P. 1880).—"Vinegar of Sanguinaria."

Composition: Sanguinaria, 100 Gm.; Dil. Acetic Acid, enough to make 1,000 Cc. Med. Properties: Stimulating Expectorant and Irritant. Uses: In chronic bronchitis and coughs. Dose: 1 to 3 Cc. (15 to 45 minims).

Balsamum Traumaticum.—"Turlington's Balsam."

Composition: Benzoin, 100 Gm.; Storax, Balsam of Tolu, of each 35 Gm.; Balsam of Peru, 16 Gm.; Aloes, Myrrh, of each 8 Gm.; Angelica Root, 4 Gm.; Alcohol, enough to make 1,000 Cc. Med. Properties: Stimulating Expectorant and Vulnerary. Uses: Internally, in disease of the respiratory organs, both in substance and by inhalation. Externally, as an application to wounds, indolent ulcers, etc. Note: The official Tinctura Benzoini Composita is a simplified preparation intended to replace the above.

Elixir Grindeliae.—"Elixir of Grindelia."

Composition: Fluid Extract of Grindelia, 65 Cc.; Compound Spirit of Orange, 10 Cc.; Deodorized Alcohol, 115 Cc.; Compound Elixir of Taraxacum, 810 Cc. Med. Properties: Expectorant, Sedative, Antispasmodic. Uses: In coughs, asthma, bronchitis, etc. Dose: 4 to 16 Cc. (one to four fluidrams).

Elixir Picis Compositum.—"Compound Elixir of Tar."

Composition: Syrup of Wild Cherry, Syrup of Tolu, of each 200 Cc.; Morphine Sulphate, 0.350 Gm.; Methylic Alcohol (pure, 90 p. c.) 50 Cc.; Water, Wine of Tar, of each enough to make 1,000 Cc. Med. Properties: Stimulant and Antiseptic Expectorant. Use: In coughs. Dose: 4 to 8 Cc. (one to two fluidrams).

Extractum Quillajae Fluidum.—"Fluid Extract of Soap Bark."

From the bark of Quillaja Saponaria, Mol., with Diluted Alcohol. Med. Properties: Stimulant, Expectorant, Laxative, Diuretic. Uses: In coughs, bronchitis, etc. Dose: 1 to 2 Cc. (15 to 30 minims).

Extractum Trillii Fluidum.—"Fluid Extract of Bethroot."

From the rhizome of Trillium erectum, L., with a mixture of 3 volumes of Alcohol and 2 volumes of Water. Med. Properties: Expectorant, Astringent, Alterative. Uses: In bronchial and asthmatic affections. Dose: 2 to 4 Cc. (30 to 60 minims).

Extractum Verbasci Fluidum.—"Fluid Extract of Mullin."

From the leaves and flowers of Verbascum Thapsus, L., with Diluted Alcohol. Med. Properties: Demulcent, Anodyne. Uses: In coughs and pulmonary disorders. Dose: 4 to 8 Cc. (one to two fluidrams).

Glyceritum Picis Liquidae.—"Glycerite of Tar."

Composition: Tar, 65 Gm. (Magnesium Carbonate, 25 Gm.); Glycerin, 250 Cc.; Alcohol, 125 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Expectorant. Uses: As an addition to cough mixtures. Dose: 4 to 8 Cc. (one to two fluidrams).

Mistura Acaciae.—"Mixtura Gummosa (Pharm. Germ. 1.)."

Composition: Acacia, Sugar, of each 75 Gm.; Water, 850 Cc. Med. Properties: Demulcent. Uses: As an adjuvant to cough mixtures, and to mixtures containing heavy powders in suspension.

Mistura Ammonii Chloridi.—"Mistura Solvens Simplex."

Composition: Ammonium Chlorid, Purified Extract of Licorice, of each 25 Gm.; Water, enough to make 1,000 Cc. Med. Properties: Expectorant. Uses: In bronchial coughs, etc. Dose: 4 to 16 Cc. (one to four fluidrams).

Mistura Expectorans, Stokes.—"Stokes' Expectorant."

Composition: Ammonium Carbonate, 17.5 Gm.; Fluid Extract of Senega, Fluid Extract of Squill, of each 35 Cc.; Camphorated Tincture of Opium, 175 Cc.; Water, 100 Cc.; Syrup of Tolu, enough to make 1,000 Cc. Med. Properties: Expectorant. Uses: For coughs. Dose: 4 to 8 Cc. (one to two fluidrams).

Mistura Guaiaci.—"Guaiac Mixture."

Composition: Guaiac, Sugar, of each 25 Gm.; Acacia, 15 Gm.; Cinnamon Water, 1,000 Cc. Med. Properties: Antispasmodic, Alterative, Expectorant. Uses: Internally in rheumatism, dysmenorrhea and amenorrhea, and as a gargle in tonsillitis. Dose: 8 to 16 Cc. (two to four fluidrams).

Mistura Olei Picis.—"Tar Mixture."

Composition: Oil of Tar, 35 Cc.; Purified Extract of Licorice, 65 Gm.; Sugar, 250 Gm.; Chloroform, 10 Cc.; Oil of Peppermint, 3 Cc.; Alcohol, 160 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Expectorant. Uses: For coughs. Dose: 4 to 8 Cc. (one to two fluidrams).

Oxymel Scillae.—"Oxymel of Squill."

Composition: 50 Gm. of Vinegar of Squill and 100 Gm. of Honey, reduced by evaporation to 100 Gm. Med. Properties: Expectorant, Diuretic. Uses: As a substitute for the official "Syrup of Squill." Dose: 2 to 4 Cc. (one-half to one fluidram).

Species Pectorates.—"Breast Tea."

Composition: Althæa Root, peeled, 8 parts; Coltsfoot Leaves, 4 parts; Russian Licorice, peeled, 3 parts; Anise, Mullein Flowers, of each 2 parts; Orris Root, 1 part. Med. Properties: Demulcent, Expectorant. Uses: As tea in coughs and colds.

Syrupus Actaeae Compositus.—"Compound Syrup of Black Cohosh."

Composition: Fluid Extract of Cimicifuga, 40 Cc.; Fluid Extract of Licorice, Fluid Extract of Senega, of each 20 Cc.; Fluid Extract of Ipecac, 10 Cc.; Wild Cherry Bark, 40 Gm.; Sugar, 650 Gm.; Water, enough to make 1,000 Cc. Med. Properties: Antispasmodic, Expectorant. Uses: In chronic bronchitis. Dose: 4 to 8 Cc. (one to two fluidrams).

Syrupus Chondri Compositus.—"Compound Syrup of Irish Moss."

Composition: Irish Moss, 1 Gm.; Fluid Extract of Ipecac, 1 Cc.; Fluid Extract of Squill, Fluid Extract Senega, of each 16 Cc.; Camphorated Tincture of Opium, 28 Cc.; Sugar, 650 Gm.; Water, enough to make 1,000 Cc. Med. Properties: Expectorant. Uses: For coughs. Dose: 4 to 16 Cc. (one to four fluidrams).

Syrupus Codeinae.—"Syrup of Codein."

Composition: Codein Sulphate, 1 Gm.; Syrup, 100 Cc. Med. Properties: Anodyne, Pulmonary, Narcotic. Uses: To allay cough and quiet intestinal pain. Dose: 2 to 4 Cc. (30 to 60 minims). Note: This syrup is about four times as strong as the Syrupus Codeini of the Codex.

Syrupus Eriodictyi Aromaticus.—"Aromatic Syrup of Yerba Santa."

Composition: Fluid Extract of Eriodictyon, 32 Cc.; Solution of Potassa, 25 Cc.; Compound Tincture of Cardamom, 65 Cc.; Oil of Sassafras, Oil of Lemon, of each 0.5 Cc.; Oil of Cloves, 1 Cc.; Alcohol, 32 Cc.; Sugar, 800 Gm.; Water, enough to make 1,000 Cc. Med. Properties: Aromatic, Expectorant. Uses: Principally as a vehicle for disguising the bitterness of quinin. Dose: 4 to 8 Cc. (one to two fluidrams).

Syrupus Glycyrrhizae.—"Syrup of Licorice."

Composition: Pure Extract of Licorice (U. S. P.), Glycerin, of each 125 Gm.; Sugar, 650 Gm.; Water, enough to make 1,000 Cc. Med. Properties: Expectorant, Laxative. Uses: As an adjuvant to cough medicine. Dose: 4 to 8 Cc. (one to two fluidrams) or more.

Syrupus Ipecacuanhae et Opii.—"Syrup of Dover's Powder."

Composition: Fluid Extract of Ipecac, 8.5 Cc.; Tincture of Deodorized Opium, 85 Cc.; Sugar, 775 Cc.; Cinnamon Water, enough to

make 1,000 Cc. Med. Properties: Anodyne. Diaphoretic. Uses: In diseases requiring active diaphoresis. Dose: 4 to 8 Cc. (one to two fluidrams).

Syrupus Morphinae Compositus.—"Compound Syrup of Morphin."

Composition: Fluid Extract of Ipecac, 2 Cc.; Fluid Extract of Senega, 100 Cc.; Fluid Extract of Rhubarb, 14 Cc.; Morphin Sulphate, 0.55 Cc.; Oil of Sassafras, 1 Cc.; Syrup, 881 Cc. Med. Properties: Sedative. Expectorant. Uses: In bronchial coughs, etc. Dose: 4 to 8 Cc. (one to two fluidrams).

Syrupus Morphinae Sulphatis.—"Syrup of Morphin."

Composition: Morphin Sulphate, 2.2 Gm.; Syrup, 1,000 Cc. Med. Properties: Sedative. Somnifacient. Uses: To allay coughs. Dose: 2 to 4 Cc. (30 to 60 minims).

Syrupus Papaveris.—"Syrup of Poppy."

Composition: Tincture of Poppy (Form. 414), 575 Cc. (evaporate to 450 Cc.); Sugar, 775 Gm.; Water, enough to make 1,000 Cc. Med. Properties: Sedative. Expectorant. Uses: In coughs of infants and children. Dose: 1 to 2 Cc. (15 to 30 minims) or more, according to age.

Syrupus Pectoralis.—"Jackson's Pectoral Syrup."

Composition: Morphin Hydrochlorate, 0.55 Cc.; Oil of Sassafras, 0.5 Cc.; Syrup of Acacia, 1,000 Cc. Med. Properties: Sedative. Expectorant. Uses: In coughs of children. Dose: 1 to 2 Cc. (15 to 30 minims) or more, according to age.

Syrupus Pini Strobi Compositus.—"Compound Syrup of White Pine."

Composition: White Pine Bark, Wild Cherry Bark, of each 75 Gm.; Spikenard Root, Balm of Gilead Buds, of each 10 Gm.; Sanguinaria Root, 8 Gm.; Sassafras Bark, 7 Gm.; Morphin Sulphate, 0.5 Gm.; Chloroform, 6 Cc.; Alcohol, Water, Syrup, of each enough to make 1,000 Cc. Med. Properties: Expectorant. Sedative. Uses: In winter coughs. Dose: 4 to 8 Cc. (one to two fluidrams).

Syrupus Sanguinariae.—"Syrup of Blood Root."

Composition: Sanguinaria, 225 Gm.; Acetic Acid, 125 Cc.; Sugar, 500 Gm.; Water, enough to make 1,000 Cc. Med. Properties: Expectorant. Alterative. Narcotic. Emetic. Uses: For coughs and bronchitis. Dose: 1 to 3 Cc. (15 to 45 minims).

Vinum Picis.—"Wine of Tar."

Composition: Tar (washed), 100 Gm.; Stronger White Wine, enough to make 1,000 Cc. Med. Properties: Expectorant. Antiseptic. Uses: In pulmonary coughs. Dose: 8 to 16 Cc. (two to four fluidrams).

Vinum Pruni Virginianae.—"Wine of Wild Cherry Bark."

Composition: Wild Cherry Bark, 250 Gm.; Sugar, 165 Gm.; Water, 200 Cc.; Alcohol, 75 Cc.; Angelica Wine, enough to make 1,000 Cc. Med. Properties: Tonic, Sedative. Uses: In debility of the stomach. Dose: 4 to 8 Cc. (one to two fluidrams).

Vinum Pruni Virginianae Ferratum.—"Ferrated Wine of Wild Cherry."

Composition: Tincture of Citro-Chlorid of Iron, 85 Cc.; Wine of Wild Cherry, 915 Cc. Med. Properties: Chalybeate. Tonic. Seda-

tive. Uses: In anemia, debility, etc. Dose: 4 to 8 Cc. (one to two fluidrams).

Febrifuges.

Aqua Sedativa.—"Eau Sédative de Raspail."

Composition: Ammonia Water, 125 Cc.; Spirit of Camphor, 12 Cc.; Sodium Chlorid, 65 Gm.; Water, enough to make 1,000 Cc. Med. Properties: Antispasmodic, Sedative and Diaphoretic. Uses: Externally, and internally in headaches and febrile complaints. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Extractum Verbenae Fluidum.—"Fluid Extract of Vervain."

From the root of Verbena hastata, L., with Diluted Alcohol. Med. Properties: Tonic, Antiperiodic, Diaphoretic. Uses: In fevers. Dose: 1 to 2 Cc. (15 to 30 minims).

Liquor Sodii Citratis.—"Potio Riveri" (Pharm. Germ.).

Composition: Citric Acid, 20 Gm.; Sodium Bicarbonate, 25 Gm.; Water, 1,000 Cc. Med. Propertes: Refrigerant, Diaphoretic, Diuretic. Uses: In fevers and rheumatic affections. Dose: 8 to 16 Cc. (two to four fluidrams). Note: This preparation should be made as required.

Liquor Sodii Citro-Tartratis.—"Tartro-Citric Lemonade."

Composition: Sodium Bicarbonate, 26 Gm.; Tartaric Acid, 24 Gm.; Citric Acid, 2 Gm.; Syrup of Citric Acid, 50 Cc.; Water, enough to make 350 Cc. Med. Properties: Refrigerant, Diaphoretic, Laxative. Uses: In fevers, constipation, etc. Dose: As a laxative, one-fourth, one-half or the whole of the above. Note: This preparation should be effervescent, and dispensed in strong, tightly-corked bottles.

Tinctura Aconiti, Fleming.—"Fleming's Tincture of Aconite."

Composition: Aconite Root, 700 Gm.; Alcohol, enough to make 1,000 Cc. Med. Properties: Local Anesthetic, Diuretic, Cardiac Depressant. Uses: In certain forms of fevers; locally to neuralgia. Dose: 0.06 to 0.125 Cc. (1 to 2 minims).

Heart Stimulants.

Extractum Convallariae Florum Fluidum.—"Fluid Extract of Lily of the Valley Flowers."

From the flowers of Convallaria majalis, L., with Diluted Alcohol. Med. Properties: Cardiac Tonic, Diuretic. Uses: In cardiac dropsy and affections of the heart. Dose: 0.3 to 1.0 Cc. (5 to 15 minims).

Pilulae Glonoini.—"Nitroglycerin Pills."

Composition: Spirit of Glonoin (U. S. P.=1 per cent), 1 Gr.; Althæa, 1 Gr.; Confection of Rose, q. s. Note: Each pill contains 0.00065 Gm. (1-100 grain) of Nitroglycerin.

Laxatives, Cathartics and Aperients.

Decoctum Aloes Compositum.—"Compound Decoction of Aloes."

Composition: Ext. Aloes, 10 Gm.; Myrrh, Saffron, of each 7.5 Gm.; Potassium Carbonate, 5 Gm.; Ext. Licorice, 35 Gm.; Comp. Tinct. Cardamom, 250 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Stimulant, Cathartic and Emmenagogue. Uses: In

habitual constipation, dyspepsia and atonic amenorrhea. Dose: 15 to 60 Cc. (one-half to two fluidounces).

Elixir Euonymi.—"Elixir of Wahoo."

Composition: Fluid Extract of Wahoo, 150 Cc.; Water, Syrup of Coffee, of each 125 Cc.; Compound Elixir of Taraxacum, 600 Cc. Med. Properties: Mild Cholagogue, Cathartic, Diuretic. Uses: In affections of the liver, dropsy, etc. Dose: 4 to 16 Cc. (one to four fluidrams).

Elixir Frangulae.—"Elixir of Buckthorn."

Composition: Fluid Extract of Buckthorn, 250 Cc.; Alcohol, 60 Cc.; Compound Elixir of Taraxacum, 250 Cc.; Aromatic Elixir, 440 Cc. Med. Properties: Mild Cathartic. Uses: In habitual constipation and as mild laxative. Dose: 4 to 16 Cc. (one to four fluidrams).

Elixir Rhamni Purshianae.—"Elixir of Cascara Sagrada."

Composition: Fluid Extract of Rhamnus Purshiana, 250 Cc.; Compound Elixir of Taraxacum, 750 Cc. Med. Properties: Tonic, Laxative or Cathartic. Uses: As a mild laxative and cathartic. Dose: 4 to 12 Cc. (one to three fluidrams).

Elixir Rhamni Purshianae Compositum.—"Laxative Elixir."

Composition: Fluid Extract of Rhamnus Purshiana, 125 Cc.; Fluid Extract of Senna, 75 Cc.; Fluid Extract of Butternut, 65 Cc.; Compound Elixir of Taraxacum, 735 Cc. Med. Properties: Tonic, Laxative or Cathartic. Uses: As a mild laxative in habitual constipation. Dose: 4 to 12 Cc. (one to three fluidrams).

Elixir Rhei.—"Elixir of Rhubarb."

Composition: Sweet Tincture of Rhubarb, 500 Cc.; Deodorized Alcohol, 65 Cc.; Water, 185 Cc.; Glycerin, Syrup, of each 125 Cc. Med. Properties: Stomachic, Cathartic. Uses: As a mild laxative in habitual constipation. Dose: 4 to 16 Cc. (one to four fluidrams).

Elixir Rhei et Magnesii Acetatis.—"Elixir of Rhubarb and Magnesia."

Composition: Magnesia, 20 Gm.; Acetic Acid, enough to dissolve and neutralize; Fluid Extract of Rhubarb, 125 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Refrigerant, Cathartic. Uses: In febrile affection attended with constipation. Dose: 2 to 8 Cc. (one-half to two fluidrams).

Emulsio Olei Ricini.—"Emulsion of Castor Oil."

Composition: Castor Oil, 32 Gm.; Acacia, 8 Gm.; Tincture of Vanilla, 2.5 Cc.; Syrup, 20 Cc.; Water, enough to make 100 Cc. Med. Properties: Purgative. Uses: In constipation, certain forms of diarrhea, etc. Dose: 15 to 60 Cc. (one-half to two fluidounces).

Extractum Berberidis Vulgaris Fluidum.—"Fluid Extract of Barberry.

From the bark of the root of Berberis vulgaris, L., with a mixture of 3 volumes of Alcohol and 2 volumes of Water. Med. Properties: Tonic, Laxative, Cholagogue, Antiperiodic. Uses: In chronic diseases of the liver, atonic dyspepsia, etc. Dose: 2 to 8 Cc. (one-half to two fluidrams).

Extractum Jalapae Fluidum.—"Fluid Extract of Jalap."

From the tuberous root of Exogonium Purga, Benth, with Alcohol. Med. Properties: Drastic Hydragogue Cathartic. Uses: For

purgations in general, usually in combinations with other cathartics. Dose: As laxative—0.125 to 0.6 Cc. (2 to 10 minims), as cathartic —0.6 to 2 Cc. (10 to 30 minims).

Extractum Juglandis Fluidum.—"Fluid Extract of Butternut."

From the inner bark of Juglans cinerea, L., with Diluted Alcohol. Med. Properties: Laxative or Mild Cathartic. Uses: In habitual constipation. Dose: 4 to 8 Cc. (one to two fluidrams).

Extractum Rhamni Purshianae Fluidum Aromaticum.—"Aromatic Fluid Extract of Cascara Sagrada."

From the bark of Rhamnus Purshiana, D. C., 1,000 Gm.; Licorice Root, 100 Gm.; (Magnesia, 125 Gm.), with a mixture of Alcohol, 500 Cc.; Glycerin, Water, of each 250 Cc.; Flavored with Compound Spirit of Orange. Med. Properties: Cathartic, Intestinal Tonic. Uses: In habitual constipation and as a general laxative. Dose: 2 to 8 Cc. (one-half to two fluidrams).

Extractum Sennae Fluidum Deodoratum.—"Deodorized Fluid Extract of Senna."

From Senna deprived of odorous and resinous constituents by Alcohol, with Diluted Alcohol. Med. Properties: Mild Cathartic. Uses: In lieu of the official fluid extract in habitual constipation, etc. Dose: 4 to 16 Cc. (one to four fluidrams).

Liquor Magnesii Sulphatis Effervescens.—"Effervescent Solution of Magnesium Sulphate."

Composition: Magnesium Sulphate, 25 Gm.; Citric Acid, 4 Gm.; Syrup of Citric Acid, 60 Cc.; Potassium Bicarbonate, 2.5 Gm.; Water, enough to make 350 Cc. Med. Properties: Cathartic, Diuretic, Refrigerant. Uses: As a substitute for the official Solution of Magnesium Citrate.

Mistura Rhei Composita.—"Squibb's Rhubarb Mixture."

Composition: Fluid Extract of Rhubarb, 12 Cc.; Fluid Extract of Ipecac, 2 Cc.; Sodium Bicarbonate, 24 Gm.; Glycerin, 250 Cc.; Peppermint Water, enough to make 1,000 Cc. Med. Properties: Laxative, Stomachic. Uses: In the treatment of bowel disorders. Dose: 4 to 16 Cc. (one to four fluidrams).

Pilulae Aloes et Podophylli Compositae.—"Janeway's Pills."

Composition: Purified Aloes, 1 gr.; Resin of Podophyllum, ½ gr.; Alcoholic Extract of Belladonna Leaves, ¼ gr.; Extract of Nux Vomica, ¼ gr.

Pilulae Aloini Compositae.—"Compound Pills of Aloin."

Composition: Aloin, ½ gr.; Resin of Podophyllum, ⅛ gr.; Alcoholic Extract of Belladonna Leaves, ¼ gr.

Pilulae Aloini, Strychninae et Belladonnae.—"Pills of Aloin, Strychnin and Belladonna."

Composition: Aloin, 1-5 gr; Strychnin (alkaloid), 1-120 gr., Alcoholic Extract of Belladonna Leaves, ⅛ gr. Note: These pills, on demand, may be prepared with double the amount of strychnin, and are usually designated as Form. No. 2.

Pilulae Aloini, Strychninae et Belladonnae Compositae.—"Compound Pills of Aloin, Strychnin and Belladonna."

Composition: Aloin, 1-5 gr.; Strychnin (alkaloid), 1-120 gr.; Alcoholic Extract of Belladonna Leaves, ⅛ gr.; Extract of Rhamnus Purshiana, ½ gr.

Pilulae Colocynthidis Compositae.—"Cochia Pills."

Composition: Extract of Colocynth (simple—U. S. P.), 1/6 gr.; Purified Aloes, 2 gr.; Resin of Scammony, 2 gr.; Oil of Cloves, ¼ minim.

Pilulae Colocynthidis et Hyoscyami.—"Pills of Colocynth and Hyoscyamus."

Composition: Extract of Colocynth (simple—U. S. P.), 1/10 gr.; Purified Aloes, 1½ gr.; Resin of Scammony, 1½ gr.; Oil of Cloves, 1/6 min.; Extract of Hyoscyamus, 1½ gr.

Pilulae Calocynthidis et Podophylli.—"Pills of Colocynth and Podophyllum."

Composition: Compound Extract of Colocynth, 2½ gr.; Resin of Podophyllum, ¼ gr.

Pilulae Laxative Post Partum.—"Barker's Post Partum Pills."

Composition: Compound Extract of Colocynth, 1 2/3 gr.; Purified Aloes, 5/6 gr.; Extract of Nux Vomica, 5-12 gr.; Resin of Podophyllum, 1-12 gr.; Ipecac, 1-12 gr.; Extract of Hyoscyamus, 1¼ gr.

Pilulae Podophylli, Belladonnae et Capsici.—"Squibb's Podophyllum Pills."

Composition: Resin of Podophyllum, ¼ gr.; Alcoholic Extract of Belladonna Leaves, ⅛ gr.; Capsicum, ½ gr.; Sugar of Milk, 1 gr.; Acacia, ¼ gr.; Glycerin and Syrup, of each, q. s.

Pilulae ad Prandum.—"Dinner Pills."

1. Lady Webster's Dinner Pills. This is the official "Pilulae Aloes et Mastiches."
2. Chapman's Dinner Pill: Purified Aloes, 1½ gr.; Mastic, 1½ gr.; Ipecac, 1 gr.; Oil of Fennel, ¼ min.
3. Cole's Dinner Pill: Purified Aloes, 1 1-5 gr.; Mass of Mercury, 1 1-5 gr.; Jalap, 1 1-5 gr.; Antimony and Potassium Tartrate, 1-50 gr.
4. Hall's Dinner Pill: Purified Aloes, 1 gr.; Extract of Licorice, 1 gr.; Soap, 1 gr.; Molasses, 1 gr.

Pilulae Triplices.—"Triplex Pills."

1. Triplex Pills: Purified Aloes, 2 gr.; Mass of Mercury, 1 gr.; Resin of Podophyllum, ¼ gr.
2. Francis' Triplex Pills: Purified Aloes, 5/6 gr.; Scammony, 5/6 gr.; Mass of Mercury, 5/6 gr.; Croton Oil, 1-20 min.; Oil of Caraway, ¼ min.; Tincture of Aloes and Myrrh, q. s.

Pulvis Hydrargyri Chloridi Mitis et Jalapae.—"Calomel and Jalap."

Composition: Mild Chlorid of Mercury, 34 Gm.; Jalap, 66 Gm. Med. Properties: Cathartic, Indirect Cholagogue. Uses: In liver affections and constipation. Dose: 0.3 to 1 Gm. (5 to 15 grains).

Pulvis Rhei et Magnesiae Anisatus.—"Compound Anise Powder."

Composition: Rhubarb, 35 Gm.; Heavy Magnesia, 65 Gm.; Oil of Anise, 8 Cc. Med. Properties: Aperient, Antacid, Carminative. Uses: In summer complaint and bowel affections of children. Dose: 0.3 to 1 Gm. (5 to 15 grains), according to age.

Pulvis Salis Carolini Factitii Effervescens.—"Effervescent Artificial Carlsbad Salt."

Composition: 1000 Gm. contain 180 Gm. of Dry Artificial Carlsbad Salt (Form. 336 I). Med. Properties: Purgative, Refrigerant,

Diuretic. Uses: As a substitute for natural Carlsbad Water. Dose: 4 to 8 Gm. (one to two drams) in a glass of water.

Pulvis Salis Kissingensis Factitii Effervescens.—"Effervescent Artificial Kissingen Salt."

Composition: 1,000 Gm. contain 280 Gm. of Artificial Kissingen Salt (Form. 337). Med. Properties: Purgative, Refrigerant, Diuretic. Uses: As a substitute for natural Kissingen water. Dose: 4 to 8 Gm. (one to two drams) in a glass of water.

Sal Carolinum Factitium.—"Artificial Carlsbad Salt."

I. In dry, amorphous form (Germ. Pharm.): Potassium Sulphate, 20 Gm.; Sodium Chlorid, 180 Gm.; Sodium Bicarbonate, 360 Gm.; Sodium Sulphate, dried, 440 Gm. II. In a crystalline form (by solution and crystallization): Potassium Sulphate, 20 Gm.; Sodium Chlorid, 180 Gm.; Sodium Carbonate (clear crystals), 610 Gm.; Sodium Sulphate (crystals), 880 Gm. Med. Properties: Purgative, Refrigerant, Diuretic. Uses: As a substitute for the natural Carlsbad Salt. Note: 1 Gm. (15 grains) of the dry, or 1.8 Gm. (27 grains) of the crystalline salt in 180 Cc. (6 fluidounces) of water, about corresponds to an equal volume of Carlsbad Water ("Sprudel").

Sal Kissingense Factitium.—"Artificial Kissingen Salt."

Composition: Potassium Chlorid, 17 Gm.; Sodium Chlorid, 357 Gm.; Magnesium Sulphate (anhydrous), 59 Gm.; Sodium Bicarbonate, 107 Gm. Med. Properties: Purgative, Refrigerant, Diuretic. Uses: As a substitute for the natural Kissingen Salt. Note: A solution of 1.6 Gm. (24 grains) in 180 Cc. (6 fluidounces) of water about corresponds to an equal volume of Kissingen water ("Rakoczi").

Species Laxantes.—"St. Germain Tea."

Composition: Senna, 16 parts; Elder Flowers, 10 parts; Fennel, Anise, of each 5 parts; Potassium Bitartrate, 4 parts. Med. Properties: Laxative. Uses: As a gentle aperient in form of infusion.

Syrupus Mannae.—"Syrup of Manna."

Composition: Manna, 125 Gm.; Sugar, 775 Gm.; Alcohol, 65 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Laxative. Uses: As a mild aperient for infants. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Syrupus Rhei et Potassae Compositus.—"Neutralizing Cordial."

Composition: Fluid Extract of Rhubarb, 17.5 Cc.; Fluid Extract of Hydrastis, 8.5 Cc.; Potassium Carbonate, 17.5 Gm.; Tincture of Cinnamon, 65 Cc.; Spirit of Peppermint, 8 Cc.; Syrup, 250 Cc.; Diluted Alcohol, enough to make 1,000 Cc. Med. Properties: Laxative, Tonic, Stomachic. Uses: As aperient in dyspepsia, indigestion, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Syrupus Rhamni Catharticae.—"Syrup of Buckthorn Berries."

Composition: Sugar, 800 Gm.; Fermented Juice of Buckthorn Berries, enough to make 1,000 Cc. Med. Properties: Laxative or Cathartic. Uses: As a general laxative. Dose: 8 to 16 Cc. (2 to 4 fluidrams).

Syrupus Sennae Aromaticus.—"Aromatic Syrup of Senna."

Composition: Senna, 125 Gm.; Jalap, 50 Gm.; Rhubarb, 17.5 Gm.; Cinnamon, Cloves, of each 4 Gm.; Nutmeg, 2 Gm.; Oil of

Lemon, 1.5 Cc.; Sugar, 750 Gm.; Diluted Alcohol, enough to make 1,000 Cc. Med. Properties: Cathartic. Uses: For active purgation. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Syrupus Sennae Compositus.—"Compound Syrup of Senna."

Composition: Fluid Extract of Senna, 135 Cc.; Fluid Extract of Rhubarb, Fluid Extract of Frangula, of each 35 Cc.; Oil of Gaultheria, 4 Cc.; Alcohol, 60 Cc.; Syrup, 731 Cc. Med. Properties: Cathartic. Uses: For active purgation. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Tinctura Jalapae.—"Tincture of Jalap."

Composition: Jalap, 200 Gm.; Alcohol, 2 vols., Water, 1 vol., enough to make 1,000 Cc. Med. Properties: Cathartic. Uses: To produce watery evacuations. Dose: 4 to 10 Cc. (1 to 2½ fluidrams).

Tinctura Jalapae Composita.—"Compound Tincture of Jalap."

Composition: Jalap, 125 Gm.; Scammony, 32 Gm.; Alcohol, 2 vols., Water, 1 vol., enough to make 1,000 Cc. Med. Properties: Cathartic. Uses: To produce watery evacuations. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Tinctura Rhei Aquosa.—"Aqueous Tincture of Rhubarb."

Composition: Rhubarb, 100 Gm.; Sodium Borate, Potassium Carbonate, of each 10 Gm.; Cinnamon Water, 150 Cc.; Alcohol, 120 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Laxative, Astringent, Antiseptic, Tonic. Uses: As an aperient in dyspepsia, cholera infantum, etc. Dose: 2 to 8 Cc. (one-half to two fluidrams).

Tinctura Rhei et Gentianae.—"Tincture of Rhubarb and Gentian."

Composition: Rhubarb, 70 Gm.; Gentian, 17.5 Gm.; Diluted Alcohol, enough to make 1,000 Cc. Med. Properties: Bitter Tonic, Aperient, Astringent. Uses: In dyspepsia. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Tinctura Rhei Vinosa.—"Vinous Tincture of Rhubarb."

Composition: Fluid Extract of Rhubarb, 80 Cc.; Fluid Extract of Bitter Orange Peel, 20 Cc.; Tincture of Cardamom, 80 Cc.; Sugar, 125 Gm.; Sherry Wine, enough to make 1,000 Cc. Med. Properties: Tonic, Aperient, Astringent. Uses: In dyspepsia, diarrhea, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Vinum Aloes.—(U. S. P. 1880)—"Wine of Aloes."

Composition: Purified Aloes, 60 Gm.; Cardamom, Ginger, of each 10 Gm.; Stronger White Wine (Form. 440), enough to make 1,000 Cc. Med. Properties: Cathartic. Uses: In habitual constipation, flatulence, gout, amenorrhea, etc. Dose: About 16 Cc. (4 fluidrams) as a laxative.

Vinum Rhei (U. S. P. 1880).—"Wine of Rhubarb."

Composition: Rhubarb, 100 Gm.; Calamus, 10 Gm.; Stronger White Wine, enough to make 1,000 Cc. Med. Properties: Tonic, Aperient. Uses: 4 to 8 Cc. (1 to 2 fluidrams).

Liniments and Counter-Irritants.

Acidum Carbolicum Iodatum.—"Iodized Phenol."

Composition: Iodin, Glycerin, of each 20 Gm.; Carbolic Acid, 60 Gm. Med. Properties: Irritant, Anesthetic and Antiseptic. Uses: Locally, as a counter-irritant and cautery.

Ceratum Extracti Cantharidis (U. S. P., 1880).—"Cerate of Extract of Cantharides."

Composition: An alcoholic extract from 300 Gm. of Cantharides, incorporated with: Resin, 150 Gm.; Yellow Wax, Lard, of each 350 Gm. Med. Properties: Vesicant. Uses: Locally, as a substitute for the official Ceratum Cantharides.

Ceratum Sabinae (U. S. P., 1880).—"Savine Cerate."

Composition: Fluid Extract of Savine, 25 Cc., evaporated with Resin Cerate, 90 Gm., until the alcohol is driven off. Med. Properties: Local Stimulant and Antiseptic. Uses: As a stimulant dressing for suppurating surfaces.

Charta Cantharidis (U. S. P., 1880).—"Cantharides Paper."

Composition: Strips of sized paper coated with a plaster prepared from: Cantharides, Canada Turpentine, of each 10 Gm.; Spermaceti, 30 Gm.; Olive Oil, 40 Gm.; White Wax, 80 Gm. Med. Properties: Vesicant. Uses: A blistering agent suitable for delicate surfaces.

Chloral Camphoratum.—"Camphorated Chloral."

Composition: Chloral, Camphor, of each equal parts. Med. Properties: Anodyne. Uses: Locally as Liniment.

Collodium Tiglii.—"Croton Oil Collodion."

Composition: Croton Oil, 10 Gm.; Flexible Collodion, 90 Gm. Med. Properties and Uses: Locally, as a counter-irritant and vesicant. Particularly useful in spinal neuralgia, sciatica, and chronic articular rheumatism.

Collodium Salicylatum Compositum.—"Corn Collodion."

Composition: Extract Indian Hemp, 2 Gm.; Salicylic Acid, 11 Gm.; Alcohol, 10 Gm.; Flexible Collodion, enough to make 100 Gm. Med. Properties and Uses: An efficient corn remedy.

Linimentum Ammonii Iodidi.—"Liniment of Ammonium Iodid."

Composition: Iodin, 4 Gm.; Oil of Rosemary, Oil of Lavender, of each 15 Cc.; Camphor, 30 Gm.; Ammonia Water, 110 Cc.; Alcohol, enough to make 1,000 Cc. Med. Properties: Stimulant, Counter-irritant. Uses: In enlargement of the glands, cold abscesses.

Linimentum Cantharidis (U. S. P., 1880).—"Cantharides Liniment."

Composition: Cantharides, 150 Gm.; extracted with Oil of Turpentine, 1,000 Cc. Med. Properties: Stimulant, Counter-irritant, Rubefacient. Uses: As a local stimulant in various affections.

Linimentum Iodi.—"Iodin Liniment."

Composition: Iodin, 125 Gm.; Potassium Iodid, 50 Gm.; Glycerin, 35 Cc.; Water, 65 Cc.; Alcohol, enough to make 1,000 Cc. Med. Properties: Stimulant and Counter-irritant. Uses: In glandular enlargements, abscesses, etc.

Linimentum Opii Compositum.—"Canada Liniment."

Composition: Tincture of Opium, 100 Cc.; Camphor, 17.5 Gm.; Alcohol, 250 Cc.; Oil of Peppermint, 25 Cc.; Ammonia Water, 375 Cc.; Oil of Turpentine, enough to make 1,000 Cc. Med. Properties: Anodyne, Stimulant. Uses: In rheumatism and neuralgia.

Linimentum Plumbi Subacetatis (U. S. P., 1880).—"Liniment of Subacetate of Lead."

Composition: Solution of Lead Subacetate, 350 Cc.; Cotton Seed

Oil, 650 Cc. Med. Properties: Astringent, Discutient. Uses: To allay swellings; in Rhus poisoning, etc.

Linimentum Saponato-Camphoratum.—"Solid Opodeldoc."

Composition: White Castile Soap, 75 Gm.; Camphor, 25 Gm.; Alcohol, 950 Gm.; Oil of Thyme, 3 Cc.; Oil of Rosemary, 6 Cc.; Stronger Ammonia Water, 50 Cc. Med. Properties: Anodyne, Antiseptic, Stimulant and Discutient. Uses: For rheumatic and local pains in general.

Linimentum Aconiti et Chloroformi.—"Liniment of Aconite and Chloroform."

Composition: Tincture of Aconite, Chloroform, of each 125 Cc.; Soap Liniment, 750 Cc. Med. Properties: Anodyne, Sedative. Uses: Locally, in rheumatic pains, gout, etc.

Linimentum Terebinthinae Aceticum.—"St. John Long's (also Stokes') Liniment."

Composition: Oil of Turpentine, 100 Cc.; fresh Egg, No. 1; Oil of Lemon, 4 Cc.; Acetic Acid, 20 Cc.; Rose Water, 85 Cc. Med. Properties: Counter-irritant, Antiseptic. Uses: For local pains, inflammation, rheumatism.

Linimentum Tiglii.—"Croton Oil Liniment."

Composition: Croton Oil, 12 Cc.; Oil of Cajuput, Alcohol, of each 44 Cc. Med. Properties: Rubefacient or Pustulant. Uses: In neuralgia, sciatica, chronic bronchitis, etc.

Linimentum Tiglii Compositum.—"Compound Croton Oil Liniment."

Composition: Croton Oil, Oil of Sassafras, Oil of Turpentine, of each 20 Cc.; Olive Oil, 40 Cc. Med. Properties: Rubefacient. Uses: In rheumatism, neuralgia, sciatica, chronic bronchitis.

Liquor Calcis Sulphuratae.—"Solution of Sulphurated Lime."

Composition: Lime, 165 Gm.; Sublimated Sulphur, 250 Gm.; Boiling Water, enough to make 1,000 Gm. Med. Properties: Depilatory and Germicide. Uses: Locally, to remove hair; in acne and in itch, after dilution.

Liquor Gutta-Perchae (U. S. P., 1880).—"Solution of Gutta-Percha."

Composition: Gutta-Percha, 15 Gm.; Chloroform, 100 Cc.; Lead Carbonate (to clarify), 17 Gm. Uses: Technical, and to produce an adhesive surface for the topical application of dry powders, such as mustard, cantharides, etc.

Soda cum Calce.—"London Paste."

Composition: Soda, Lime, equal parts. Med. Properties: Caustic. Uses: As cautery.

Spiritus Acidi Formici.—"Spiritus Formicarum."

Composition: Formic Acid, 35 Cc.; Distilled Water, 225 Cc.; Alcohol, enough to make 1,000 Cc. Med. Properties: Rubefacient. Uses: As counter-irritant in local pains.

Spiritus Saponatus.—"Spirit of Soap."

Composition: Castile Soap, 175 Gm.; Alcohol, 600 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Detergent. Uses: As a soap, and as a basis for liniments.

Spiritus Sinapis.—"Spirit of Mustard."

Composition: Volatile Oil of Mustard, 2 Gm.; Alcohol, 100 Gm.

Med. Properties: Rubefacient. Uses: As counter-irritant and substitute for mustard plaster.

Tinctura Saponis Viridis Composita.—"Compound Tincture of Green Soap."

Composition: Green Soap, 150 Gm.; Oil of Cade, 20 Cc.; Alcohol, enough to make 1,000 Cc. Med. Properties: Detergent, Cutaneous Stimulant. Uses: Locally, in skin affections.

NERVOUS SEDATIVES, ANTISPASMODICS AND ANTINEURALGICS.

Elixir Ammonii Bromidi.—"Elixir of Ammonium Bromid."

Composition: Ammonium Bromid, 85 Gm.; Citric Acid, 4 Gm.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Cerebro-spinal Depressant. Uses: In nerve affection, particularly in neurosis and epilepsy. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Elixir Ammonii Valerianatis.—"Elixir of Ammonium Valerianate."

Composition: Ammonium Valerianate, 35 Gm.; Chloroform, 0.8 Cc.; Tincture of Vanilla, Comp, Tincture of Cudbear, of each 16 Cc.; Ammonia Water, sufficient to neutralize; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Antispasmodic Sedative. Uses: In hysteria, epilepsy, chorea, neuralgia. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Elixir Ammonii Valerianatis et Quininae.—"Elixir of Ammonium Valerianate and Quinin."

Composition: Quinin Hydrochlorate, 4.25 Gm.; Elixir of Ammonium Valerianate, 1,000 Cc. Med. Properties: Antispasmodic and Tonic. Uses: In hysteria, neuralgia, chorea, etc.

Elixir Calcii Bromidi.—"Elixir of Calcium Bromid."

Composition: Calcium Bromid, 85 Gm.; Citric Acid, 4 Gm.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Cerebro-spinal and Muscular Depressant. Uses: In epilepsy and hysteria. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Elixir Guaranae.—"Elixir of Guarana."

Composition: Fluid Extract of Guarana, Aromatic Elixir, of each 200 Cc.; Compound Elixir of Taraxacum, 600 Cc. Med. Properties: Cerebral Stimulant, Tonic, Sedative, Diuretic. Uses: In headache, migraine, etc. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Elixir Humuli.—"Elixir of Hops."

Composition: Fluid Extract of Hops, 125 Cc.; Tincture of Vanilla, 30 Cc.; Compound Elixir of Taraxacum, 125 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Anodyne, Diaphoretic, Tonic. Uses: In insomnia, nervous affections, delirium tremens. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Elixir Paraldehydi.—"Elixir of Paraldehyde—25 per cent."

Composition: Paraldehyde, 250 Cc.; Glycerin, 125 Cc.; Alcohol, 315 Cc.; Tincture of Cardamom, 17.5 Cc.; Oil of Orange, Oil of Cinnamon, of each 2 Cc.; Compound Tincture of Cudbear (to color), 15 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Hypnotic, Stimulant, Antispasmodic. Uses: In insomnia. Dose: 4 to 16 Cc. (1 to 4 fluidrams). Note: This elixir will mix clear with Aromatic Elixir, and directions are given in the text of the "Formulary" to reduce it to any desired percentage—10 per cent, 15 per cent, etc.—as may be required in particular cases.

Elixir Potassii Bromidi.—"Elixir of Potassium Bromid."

Composition: Potassium Bromid, 175 Gm.; Citric Acid, 4 Gm.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Cerebro-spinal Sedative and Hypnotic. Uses: In neuroses, epilepsy, headache, etc. Dose: 4 to 12 Cc. (1 to 3 fluidrams).

Elixir Sodii Bromidi.—"Elixir of Sodium Bromid."

Composition: Sodium Bromid, 175 Gm.; Citric Acid, 4 Gm.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Cerebro-spinal Sedative and Hypnotic. Uses: In neuroses, epilepsy, headache, insomnia. Dose: 4 to 12 Cc. (1 to 3 fluidrams).

Elixir Zinci Valerianatis.—"Elixir of Zinc Valerianate."

Composition: Zinc Valerianate, 17.5 Gm.; Stronger Solution of Ammonium Citrate, 100 Cc.; Alcohol, 125 Cc.; Spirit of Bitter Almond, 10 Cc.; Tincture of Cudbear (to color), 15 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Antispasmodic. Uses: In nervousness, epilepsy, neuralgia. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Extractum Humuli Fluidum.—"Fluid Extract of Hops."

From the strobiles of Humulus lupulus, L., with a mixture of 5 volumes of Alcohol and 3 volumes of Water. Med. Properties: Soporific, Tonic, Diaphoretic. Uses: In insomnia, dyspepsia, and diseases of the bladder. Dose: 2 to 4 Cc. (30 to 60 minims).

Liquor Magnesii Bromidi.—"Solution of Magnesium Bromid."

Composition: Diluted Hydrobromic Acid, 1,000 Cc.; Magnesium Carbonate, sufficient to saturate. Med. Properties: Cerebro-spinal Depressant. Uses: In insomnia, hysteria, etc. Dose: 2 to 6 Cc. (one-half to one and one-half fluidrams).

Mistura Chlorali et Potassii Bromidi Composita.—"Compound Mixture of Chloral and Potassium Bromid."

Composition: Chloral, Potassium Bromid, of each 250 Gm.; Extract of Indian Cannabis, Extract of Hyoscyamus, of each 2 Gm.; Alcohol, 60 Cc.; Tincture of Quillaja, 65 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Antispasmodic, Hypnotic. Uses: In nervous insomnia, mania, delirium tremens, etc. Dose: 4 Cc. (1 fluidram). increased according to circumstances.

Pilulae Antineuralgicae.—"Antineuralgic Pills."

1. Gross' Antineuralgic Pills: Quinin Sulphate, 2 grains; Morphin Sulphate, 1-20 grain; Strychnin (alkaloid), 1-30 grain; Arsenous Acid, 1-20 grain; Extract of Aconite Leaves (U. S. P., 1870), one-half grain.

2. Brown-Séquard's Neuralgic Pills: Extract of Hyoscyamus, 2-3 grain; Extract of Conium, 2-3 grain; Extract of Ignatia, 1-2 grain; Extract of Opium, 1-2 grain; Extract of Aconite Leaves (U. S. P., 1870), 1-3 grain; Extract of Indian Cannabis, 1-4 grain; Extract of Stramonium, 1-5 grain; Alcoholic Extract of Belladonna, Leaves, 1-6 grain.

Pulvis Potassii Bromidi Effervescens.—"Effervescent Potassium Bromid."

Composition: 1,000 Gm. contain 110 Gm. of Potassium Bromid.—See Form. 319. Med. Properties: Cerebro-spinal Depressant. Uses: In headache and nervous insomnia.

Pulvis Potassii Bromidi Effervescens cum Caffeina.—"Effervescent Potassium Bromid with Caffein."

Composition: 1,000 Gm. contain 110 Gm. of Potassium Bromid and 11 Gm. of Caffein.—See Form. 319. Med. Properties: Sensory Cerebral Sedative. Uses: In headaches.

Tinctura Conii (U. S. P., 1880).—"Tincture of Conium."

Composition: Conium (fruit), 150 Gm.; Diluted Hydrochloric Acid, 4 Gm.; Diluted Alcohol, enough to make 1,000 Gm. Med. Properties: Sedative, Anodyne, Antispasmodic. Uses: In nervous affections, rheumatism, etc. Dose: 1 to 4 Cc. (15 to 60 minims).

Nervous Stimulants.

Caffeinae Sodio-Benzoas.—"Caffein Sodio-Benzoate."

Composition: Caffein, Sodium Benzoate, of each 50 Gm. Med. Properties: Cerebral and Cardiac Stimulant; Diuretic. Uses: By reason of its ready solubility in water (1:2) and non-irritant qualities, a convenient medium for the hypodermic administration of caffein. Indicated in gout and rheumatism, and in tuberculosis. Dose: 0.2 to 0.5 Gm. (3 to 7½ grains).

Caffeinae Sodio-Salicylas.—"Caffein Sodio-Salicylate."

Composition: Caffein, Sodium Salicylate, of each 50 Gm. Med. Properties: Cerebral and Cardiac Stimulant, Diuretic. Uses: Hypodermically and internally; indicated particularly in gout and rheumatism (soluble in 2 parts of water). Dose: 0.2 to 0.5 Gm. (3 to 7½ grains).

Elixir Caffeinae.—"Elixir of Caffein."

Composition: Caffein, 17.5 Gm.; Dil. Hydrobromic Acid, 4 Cc.; Syr. of Coffee, 250 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Cerebral and Cardiac Stimulant, Diuretic. Uses: In nervous headache, undue somnolence or narcosis. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Elixir Erythroxyli.—"Elixir of Coca."

Composition: Fluid Extract of Coca, 125 Cc.; Tincture of Vanilla, 16 Cc.; Alcohol, 62.5 Cc.; Syrup, 125 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Cerebral Stimulant, Tonic. Uses: In general debility. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Elixir Erythroxyli et Guaranae.—"Elixir of Coca and Guarana."

Composition: Fluid Extract of Coca, Fluid Extract of Guarana, of each 125 Cc.; Compound Elixir of Taraxacum, 750 Cc. Med. Properties: Cerebral Stimulant, Anodyne, Tonic, Diuretic. Uses: In general debility, headache. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Elixir Phosphori et Nucis Vomicae.—"Elixir of Phosphorus and Nux Vomica."

Composition: Tincture of Nux Vomica, 35 Cc.; Elixir of Phosphorus, 965 Cc. Med. Properties: Cerebro-spinal Stimulant, Aphrodisiac and Tonic. Uses: In neuralgia, melancholia, sexual exhaustion. Dose: 2 to 8 Cc. (one-half to two fluidrams).

Elixir Turnerae.—"Elixir of Damiana."

Composition: Fluid Extract of Damiana, 150 Cc.; Alcohol, 250 Cc.; Glycerin, 65 Cc.; Aromatic Elixir, enough to make 1,000 Cc.

Med. Properties: Aphrodisiac. Uses: In sexual debility. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Extractum Camelliae Fluidum.—"Fluid Extract of Tea."

From the best quality of black tea—preferably "Formosa Oolong"—with a mixture of Alcohol, 250, Water, 685, and Glycerin, 65 volumes. Med. Properties: Cerebral Stimulant, Astringent. Uses: In nervous headache, diarrhea, and as a restorative. Dose: 2 to 4 Cc. (one-half to one fluidram).

Extractum Coffeae Viridis Fluidum.—"Fluid Extract of Green Coffee."

From the commercial unroasted seeds of Coffea arabica, L., preferably "Java" or "Mocha," with a mixture of Alcohol, 250, Water, 685, and Glycerin, 65 volumes. Med. Properties: Cerebro-spinal Stimulant and Diuretic. Uses: In migraine, and as a restorative. Dose: 2 to 4 Cc. (one-half to one fluidram).

Extractum Coffeae Tostae Fluidum.—"Fluid Extract of Roasted Coffee."

From the commercial roasted seeds of Coffea arabica, L., preferably "Java" or "Mocha," with a mixture of Alcohol, 250, Water, 685, and Glycerin, 65 volumes. Med. Properties: Cerebro-spinal Stimulant and Diuretic. Uses: In headache, and as a flavoring. Dose: 2 to 4 Cc. (one-half to one fluidram).

Extractum Turnerae Fluidum.—"Fluid Extract of Damiana."

From the leaves of Turnera microphylla, D. C., with a mixture of 2 volumes of Alcohol and 1 volume of Water. Med. Properties: Aphrodisiac, Tonic, Diuretic. Uses: In sexual atony. Dose: 2 to 4 Cc. (one-half to one fluidram).

Liquor Phosphori.—"Thompson's Solution of Phosphorus."

Composition: Phosphorus, 0.07 Gm.; Absolute Alcohol, 35 Cc.; Spirit of Peppermint, 0.5 Cc.; Glycerin, 64.5 Cc. Med. Properties: Stimulant, Tonic. Uses: In cerebral affections, sexual exhaustion, neuralgia. Dose: 0.5 to 1 Cc. (7 to 15 minims).

Liquor Strychninae Acetatis.—"Hall's Solution of Strychnin."

Composition: Strychnin Acetate, 2.1 Gm.; Diluted Acetic Acid, 35 Cc.; Alcohol, 250 Cc.; Compound Tincture of Cardamom, 10 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Tonic, Spinal Stimulant. Uses: In paralytic affections, dyspepsia, debility, etc. Dose: 0.6 to 2 Cc. (10 to 30 minims), equal to 0.0013 to 0.004 Gm. (1-50 to 1-16 grain) of Strychnin Acetate. Note: This must not be confounded with the "Liquor Strychninae Hydrochloratis" (syn. "Liquor Strychninae"), which is much stronger.

Tinctura Ignatiae (U. S. P., 1880).—"Tincture of Ignatia."

Composition: Ignatia, 10 Gm., extracted with a mixture of 8 vols. of Alcohol and 1 vol. of water, to make 100 Cc., or so much as may be necessary to contain 1 per cent by weight of dry extract. Med. Properties: Tonic, Spinal Stimulant. Uses: In dyspepsia, debility, paralysis, etc. Dose: 0.2 to 0.65 Cc. (3 to 10 minims).

Vinum Erythroxyli.—"Wine of Coca."

Composition: Fluid Extract of Coca, Alcohol, of each 65 Cc.; Sugar, 65 Gm.; Claret Wine, enough to make 1,000 Cc. Med. Properties: Cerebral Stimulant, Tonic. Uses: In general debility. Dose. 4 to 8 Cc. (1 to 2 fluidrams).

Vinum Erythroxyli Aromaticum.—"Aromatic Wine of Coca."

Composition: Fluid Extract of Coca, 65 Cc.; Compound Elixir of Taraxacum (Form. 111), 10 Cc.; Syrup of Coffee (Form. 367), 25 Cc.; Port Wine, 165 Cc.; Aromatic Elixir, 300 Cc.; Sherry Wine, enough to make 1,000 Cc. Med. Properties: Cerebral Stimulant, Tonic. Uses: In general debility. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

PLASTERS, OINTMENTS, OLEATIS, ETC.

Emplastrum Ammoniaci (U. S. P., 1880).—"Ammoniac Plaster."

Composition: Ammoniac, purified by treatment with Diluted Acetic Acid. Med. Properties: Stimulant, Discutient. Uses: Externally, in scrofulous affections.

Emplastrum Aromaticum.—"Spice Plaster."

Composition: Cloves, Saigon Cinnamon, Ginger, of each 10 Gm.; Capsicum, Camphor, of each 5 Gm.; Cotton Seed Oil, 35 Gm.; Lead Plaster, 25 Gm. Med. Properties: Rubefacient. Uses: Externally, in colic, rheumatism, and other local pains.

Emplastrum Asafoetidae (U. S. P., 1880).—"Asafetida Plaster."

Composition: Asafetida, Lead Plaster, of each 35 Gm.; Galbanum, Yellow Wax, of each 15 Gm. Med. Properties: Local Stimulant and Antispasmodic. Uses: Externally, in flatulent colic, whooping cough, etc.

Emplastrum Fuscum Camphoratum.—"Camphorated Mother Plaster."

Composition: Red Oxid of Lead, 300 Gm.; Olive Oil, 600 Gm.; Yellow Wax, 150 Gm.; Camphor, 10 Gm. Med. Properties: Discutient and Protective. Uses: Externally, as a vulnerary.

Emplastrum Galbani (U. S. P., 1880).—"Galbanum Plaster."

Composition: Galbanum, 16 Gm.; Turpentine, 2 Gm.; Burgundy Pitch, 6 Gm.; Lead Plaster, 76 Gm. Med. Properties: Local Stimulant. Uses: Externally, in chronic rheumatism, pleurisy, etc.

Emplastrum Picis Canadensis (U. S. P., 1880).—"Canada Pitch Plaster."

Composition: Canada Pitch, 90 Gm.; Yellow Wax, 10 Gm. Med. Properties: Mild Counter-irritant. Uses: Externally, in rheumatism and other local pains.

Emplastrum Picis Liquidae Compositum.—"Compound Tar Plaster."

Composition: Resin, 50 Gm.; Tar, 40 Gm.; Podophyllum, Poke Root, Sanguinaria, of each 10 Gm. Med. Properties: Counter-irritant. Uses: Externally, in muscular rheumatism and disease of the chest.

Oleum Carbolatum.—"Carbolized Oil."

Composition: Carbolic Acid, 5 Gm.; Cotton Seed Oil, 95 Gm. Med. Properties: Antiseptic. Uses: Locally, as inunction.

Oleum Hyoscyami Compositum—"Balsamum Tranquillans."

Composition: Oil of Wormwood, Lavender, Rosemary, Sage and Thyme, of each 2 drops; Infused Oil of Hyoscyamus (Form. 279), 100 Cc. Med. Properties: Sedative, Anodyne. Uses: Locally, as an embrocation in neuralgic and rheumatic pains.

Oleatum Zinci.—"Zinc Oleate."

Composition: The product obtained by the reaction of 115 Gm. of Zinc Acetate upon 5,000 Cc. of Solution of Sodium Oleate (Form. 246), having the consistence of "a soft white powder," and containing about 13 per cent of Zinc Oxid. Med. Properties: Antiseptic, Discutient. Uses: As a Dusting Powder for inflamed surfaces.

Oleatum Aconitinae.—"Oleate of Aconitin."

Composition: Aconitin, 2 Gm.; Oleic Acid, 98 Gm. Med. Properties: Acronarcotic, Antipruritic, Local Anesthetic. Uses: Externally, in neuralgia, rheumatic pains, etc.

Oleatum Plumbi.—"Lead Oleate."

Composition: The product obtained by the reaction of 75 Gm. of Lead Acetate upon 2,000 Cc. of Solution of Sodium Oleate (Form. 246), having the consistence of "Lead Plaster," and containing about 28 per cent of lead oxid. Med. Properties: Astringent, Antiseptic, Discutient. Uses: As a substitute for lead plaster, particularly in ointments.

Oleatum Quininae.—"Oleate of Quinin."

Composition: Quinin (alkaloid), 25 Gm.; Oleic Acid, 75 Gm. Med Properties: Antiperiodic, Antipyretic. Uses: Locally, as inunction in fevers.

Species Emollientes.—"Emollient Cataplasm."

Composition: Althæa Leaves, Mallow Leaves, Melilot Tops, Matricaria, Flaxseed, of each equal parts, reduced to a uniform coarse powder. Uses: As poultice.

Unguentum Acidi Gallici (U. S. P., 1880).—"Gallic Acid Ointment."

Composition: Gallic Acid, 10 Gm.; Benzoinated Lard, 90 Gm.; Med. Properties: Astringent, Hemostatic. Uses: Locally, in the treatment of scurf.

Unguentum Calaminae.—"Turner's Cerate."

Composition: Prepared Calamin, 16.5 Gm.; Ointment, 83.5 Gm. Med. Properties: Astringent. Uses: For cutaneous eruptions and excoriations.

Unguentum Camphorae.—"Camphor Ointment."

Composition: Camphor, 22 Gm.; White Wax, 11 Gm.; Lard, 67 Gm. Med. Properties: Stimulant, Emollient. Uses: For chapped and roughened cuticle.

Unguentum Fuscum.—"Mother's Salve."

Composition: Camphorated Mother Plaster (Form. 119), 50 Gm.; Olive Oil, Suet, of each 25 Gm. Med. Properties: Discutient and Protective. Uses: Locally, as a vulnerary.

Unguentum Mezerei (U. S. P., 1880).—"Mezereum Ointment."

Composition: Fluid Extract of Mezereum (Form 170), 25 Cc.; Lard, 80 Gm.; Yellow Wax, 12 Gm. Med. Properties: Local Irritant. Uses: To maintain a discharge from suppurating surfaces.

Unguentum Picis Compositum.—"Compound Tar Ointment."

Composition: Oil of Tar, 4 Gm.; Tincture of Benzoin, 2 Cc.; Oxid of Zinc, 3 Gm.; Yellow Wax, 26 Gm.; Lard, 32 Gm.; Cotton Seed Oil, 35 Gm. Med. Properties: Antiseptic, Astringent. Uses: In scabies, psoriasis, chronic eczema, prurigo, etc.

Unguentum Sulphuris Alkalinus (U. S. P., 1880).—"Alkalin Sulphur Ointment."

Composition: Washed Sulphur, 20 Gm.; Potassium Carbonate, 10 Gm.; Water, 5 Cc.; Benzoinated Lard, 65 Gm. Med. Properties: Antiseptic Parasiticide. Uses: In scabies chiefly.

Unguentum Sulphuris Compositum.—"Hebra's Itch Ointment."

Composition: Precipitated Calcium Carbonate, 10 Gm.; Sublimed Sulphur, Oil of Cade, of each 15 Gm.; Soft Soap, Lard, of each, 30 Gm. Med. Properties: Antiseptic Parasiticide. Uses: In scabies, eczema, lupus, etc.

STIMULANTS, TONICS AND RECONSTRUCTIVES.

Elixir Calcii Hypophosphitis.—"Elixir of Calcium Hypophosphite."

Composition: Calcium Hypophosphite, 35 Gm.; Citric Acid, 4 Gm.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Alterative and Tonic. Uses: In anemia, rachitis, tuberculosis, etc. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Elixir Calcii Lactophosphatis.—"Elixir of Calcium Lactophosphate."

Composition: Calcium Lactate, 17.5 Gm.; Phosphoric Acid (85 per cent), 8 Cc.; Water, Syrup, of each 60 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Tonic, Alterative. Uses: In anemia, scrofula, tuberculosis, rachitis, etc. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Elixir Cinchonae.—"Elixir of Calisaya."

Composition: Tincture of Cinchona, 150 Cc.; Syrup, Glycerin, of each 125 Cc.; Aromatic Elixir, 600 Cc. Med. Properties: Febrifuge and Tonic. Uses: As a mild tonic. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Elixir Cinchonae Detannatum.—"Detannated Elixir of Calisaya."

Composition: Detannated Tincture of Cinchona (Form. 403), 150 Cc.; Syrup, Glycerin, of each 125 Cc.; Aromatic Elixir, 600 Cc. Med. Properties: Febrifuge and tonic. Uses: In place of the preceding "Elixir of Calisaya," when prescribed with Iron Preparations. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Elixir Cinchonae et Ferri.—"Elixir of Calisaya and Iron."

Composition: Phosphate of Iron, 35 Gm.; Water, 60 Cc.; Comp. Elixir of Quinin (Form. 98), enough to make 1,000 Cc. Med. Properties: Tonic Antiperiodic. Uses: In anemia, chlorosis, fevers. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Elixir Cinchonae, Ferri, Bismuthi et Strychninae.—"Elixir of Calisaya, Iron, Bismuth and Strychnin."

Composition: Strychnin Sulphate, 0.175 Gm.; Water, 10 Cc.; Elixir of Calisaya, Iron and Bismuth, 990 Cc. Med. Properties: Tonic, Astringent, Spinal Stimulant, Antiperiodic. Uses: In anemia, diarrhea, fevers, general debility. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Elixir Cinchonae, Ferri et Bismuthi.—"Elixir of Calisaya, Iron and Bismuth."

Composition: Bismuth and Ammonium Citrate, 17.5 Gm.; Water, 30 Cc.; Elixir of Calisaya and Iron, enough to make 1,000 Cc. Med. Properties: Tonic, Astringent, Stimulant, Antiperiodic. Uses:

In anemia, diarrhea, fevers, general debility. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Elixir Cinchonae, Ferri et Calcii Lactophosphatis.—"Elixir of Calisaya, Iron and Calcium Lactophosphate."

Composition: Calcium Lactate, 8.5 Gm.; Phosphoric Acid (85 per cent), 4 Cc.; Ammonia Water, 32 Cc.; Citric Acid, 16 Gm.; Elixir Calisaya and Iron, enough to make 1,000 Cc. Med. Properties: Tonic, Alterative, Antiperiodic, Stimulant. Uses: In fevers, impaired nutrition, as aid to convalescence, etc. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Elixir Cinchonae, Ferri et Pepsini.—"Elixir of Calisaya, Iron and Pepsin."

Composition: Pepsin, 17.5 Gm.; Hydrochloric Acid, 4 Cc.; Water, 175 Cc.; Elixir Calisaya and Iron, enough to make 1,000 Cc. Med. Properties: Tonic, Proteolytic, Antiperiodic, etc. Uses: In atonic conditions of the stomach, aid to convalescence, etc. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Elixir Cinchonae, Ferri et Strychninae.—"Elixir of Calisaya, Iron and Strychnin."

Composition: Strychnin Sulphate, 0.175 Gm.; Water, 15 Cc.; Elixir of Calisaya and Iron, enough to make 1,000 Cc. Med. Properties: Tonic, Antiperiodic, Astringent. Uses: In anemia, chlorosis, general debility, convalescence. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Elixir Cinchonae et Hypophosphitum.—"Elixir of Calisaya and Hypophosphites."

Composition: Calcium Hypophosphite, Sodium Hypophosphite, of each 17.5 Gm.; Citric Acid, 4 Gm.; Water, 125 Cc.; Elixir of Calisaya, enough to make 1,000 Cc. Med. Properties: Tonic, Antiperiodic, Alterative, Stimulant. Uses: In fevers, bronchial affections and during convalescence. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Elixir Cinchonae, Pepsini et Strychninae.—"Elixir of Calisaya, Pepsin and Strychnin."

Composition: Quinin Sulphate, 2 Gm.; Cinchonin Sulphate, 1 Gm.; Strychnin Sulphate, 0.175 Gm.; Elixir of Pepsin (Form. 88), enough to make 1,000 Cc. Med. Properties: Tonic, Proteolytic, Stimulant, Antiperiodic. Uses: In dyspepsia, malnutrition, convalescence from fevers, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Elixir Ferri Hypophosphitis.—"Elixir of Hypophosphite of Iron."

Composition: Solution of Hypophosphite of Iron (Form. 219), 100 Cc.; Aromatic Elixir, 900 Cc. Med. Properties: Tonic, Astringent, Alterative. Uses: In anemia, chlorosis, general debility. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Elixir Ferri Lactatis.—"Elixir of Lactate of Iron."

Composition: Lactate of Iron, 17.5 Gm.; Potassium Citrate, 52.5 Gm.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Tonic, Astringent, Diuretic. Uses: In anemia, chlorosis, general debility. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Elixir Ferri Phosphatis.—"Elixir of Phosphate of Iron."

Composition: Phosphate of Iron, 35 Gm.; Water, 60 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Tonic,

Astringent. Uses: In anemia, chlorosis, general debility, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Elixir Ferri Phosphatis Cinchonidinae et Strychninae.—"Elixir of Phosphate of Iron, Cinchonidin and Strychnin."

Composition: Phosphate of Iron, 35 Gm.; Potassium Citrate, 4.5 Gm.; Cinchonidin Sulphate, 8.5 Gm.; Strychnin Sulphate, 0.175 Gm.; Alcohol, 65 Cc.; Water, 50 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Tonic, Antipyretic, Astringent. Uses: In general debility, wasting diseases, convalescence, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Elixir Ferri Phosphatis, Quininae et Strychninae.—"Elixir of Phosphate of Iron, Quinin and Strychnin."

Composition: Phosphate of Iron, 17.5 Gm.; Quinin (alkaloid), 8.75 Gm.; Strychnin (alkaloid), 0.275 Gm.; Alcohol, 130 Cc.; Water, 50 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Tonic, Antipyretic, Antiperiodic. Uses: In fevers, general debility, dyspepsia, convalescence, etc. Dose: 4 Cc. (1 fluidram).

Elixir Ferri Pyrophosphatis.—"Elixir of Pyrophosphate of Iron."

Composition: Pyrophosphate of Iron, 35 Gm.; Water, 60 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Astringent, Tonic. Uses: In general debility, impaired nutrition, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Elixir Ferri, Quininae et Strychninae.—"Elixir of Iron, Quinin and Strychnin."

Composition: Tincture of Citro-Chlorid of Iron, 125 Cc.; Quinin Hydrochlorate, 8.5 Gm.; Strychnin Sulphate, 0.175 Gm.; Alcohol, 30 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Tonic, Astringent, Antipyretic. Uses: In fevers, general debility, impaired digestion, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Extractum Ferri Pomatum.—"Crude Malate of Iron."

Composition: Iron, 20 Gm.; Ripe Sour Apples, 1,000 Gm.; Water, enough to make 1,000 Gm. liquid, which is evaporated to the consistence of a thick extract. Med. Properties: Hematic Tonic. Uses: In chlorosis, etc. Dose: 0.2 to 1 Gm. (3 to 15 grains).

Elixir Gentianae.—"Elixir of Gentian."

Composition: Fluid Extract of Gentian, 35 Cc.; Compound Spirit of Cardamom, 25 Cc.; Aromatic Elixir, enough to make 1,000 Cc. (Ferric hydrate, enough to detannate). Med. Properties: Bitter Tonic, Alterative, Stomachic. Uses: In dyspepsia, atonic gout, intermittent fevers, etc. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Elixir Gentianae cum Tinctura Ferri Chloridi.—"Elixir of Gentian with Tincture of Chlorid of Iron."

Composition: Tincture of Citro-Chlorid of Iron, 100 Cc.; Elixir of Gentian, 900 Cc. Med. Properties: Bitter Chalybeate Tonic. Uses: In general debility, dyspepsia, anemia, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Elixir Gentianae et Ferri Phosphatis.—"Elixir of Gentian and Phosphate of Iron."

Composition: Phosphate of Iron, 17.5 Gm.; Water, 35 Cc.; Elixir of Gentian, enough to make 1,000 Cc. Med. Properties: Bitter Chaly-

beate Tonic. Uses: In general debility, dyspepsia, anemia, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Elixir Hypophosphitum.—"Elixir of Hypophosphites."

Composition: Calcium Hypophosphite, 52.5 Gm.; Sodium Hypophosphite, Potassium Hypophosphite, of each 17.5 Gm.; Citric Acid, 4 Gm.; Glycerin, Compound Spirit of Cardamom, of each 30 Cc.; Water, 250 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Alterative, Tonic. Uses: In tuberculosis, scrofula, wasting diseases. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Elixir Hypophosphitum cum Ferro.—"Elixir of Hypophosphites with Iron."

Composition: Calcium Hypophosphite, 25 Gm.; Sodium Hypophosphite, 17.5 Gm.; Potassium Hypophosphite, 8.5 Gm.; Iron Sulphate, 13 Gm.; Citric Acid, 4 Gm.; Water, Syrup, of each 250 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Alterative, Tonic, Astringent. Uses: In tuberculosis, scrofula, anemia, rachitis, etc.

Elixir Malti et Ferri.—"Elixir of Malt and Iron."

Composition: Extract of Malt, 250 Cc.; Phosphate of Iron, 17.5 Gm.; Water, 30 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Nutrient Tonic. Uses: In wasting diseases and during convalescence. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Elixir Quininae Compositum.—"Compound Elixir of Quinin."

Composition: Quinin Sulphate, 2 Gm.; Cinchonidin Sulphate, Cinchonin Sulphate, of each 1 Gm.; Aromatic Elixir, 1,000 Cc. Med. Properties, Uses and Doses the same as "Elixir of Calisaya," which it is intended to replace in certain cases, when the presence of other constituents of Cinchona is deemed objectionable.

Elixir Quininae et Phosphatum Compositum.—"Compound Elixir of Quinin and Phosphates."

Composition: Quinin Sulphate, 4 Gm.; Phosphate of Iron, Potassium Citrate, of each 17.5 Gm.; Water, 30 Cc.; Syrup of Calcium Lactophosphate, 250 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Tonic, Alterative, Stimulant, antipyretic. Uses: In fevers, wasting diseases, indigestion, convalescence, etc. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Elixir Quininae Valerianatis et Strychninae.—"Elixir of Quinin Valerianate and Strychnin."

Composition: Quinin Valerianate, 17.5 Gm.; Strychnin Sulphate, 0.175 Gm.; Compound Tincture of Cudbear (to color), 15 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Tonic, Antiperiodic, Sedative. Uses: In hysteria, nervousness, malaria, debility. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Elixir Sodii Hypophosphitis.—"Elixir of Sodium Hypophosphite."

Composition: Sodium Hypophosphite, 35 Gm.; Citric Acid, 4 Gm.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Alterative, Tonic. Uses: In tuberculosis, wasting diseases, coughs, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Elixir Strychninae Valerianatis.—"Elixir of Strychnin Valerianate."

Composition: Strychnin Valerianate, 0.175 Cc.; Tincture of Vanilla, Compound Tincture of Cudbear (to color), of each 15 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Bitter

Tonic, Stimulant and Stomachic. Uses: Is more acceptable than other strychnin preparations in certain cases. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Emulsio Olei Morrhuae cum Pruno Virginiana.—"Emulsion of Cod Liver Oil with Wild Cherry."

Composition: Cod-Liver Oil, 464 Gm.; Acacia, 116 Gm.; Fluid Extract of Wild Cherry, 65 Cc.; Syrup of Tolu, 100 Cc.; Flavoring, as selected; Water, enough to make 1,000 Cc. Med. Properties: Alterative, Nutrient, Tonic, Sedative. Uses: In phthisis, coughs, bronchitis, general debility. Dose: 8 to 16 Cc. (2 to 4 fluidrams).

Emulsio Olei Morrhuae.—"Emulsion of Cod-Liver Oil."

Composition: Cod-Liver Oil, 464 Gm.; Acacia, 116 Gm.; Syrup of Tolu, 100 Cc.; Flavoring, as selected; Water, enough to make 1,000 Cc. Med. Properties: Alterative, Nutritive. Uses: In phthisis, wasting diseases, debility. Dose: 8 to 16 Cc. (2 to 4 fluidrams).

Emulsio Olei Morrhuae cum Calcii et Sodii Phosphatibus.—"Emulsion of Cod-Liver Oil with Phosphates of Lime and Soda."

Composition: Cod-Liver Oil, 464 Gm.; Acacia, 116 Gm.; Calcium Phosphate, Sodium Phosphate, of each 17.5 Gm.; Syrup of Tolu, 100 Cc.; Flavoring, as selected; Water, enough to make 1,000 Cc. Med. Properties: Alterative, Nutritive, Tonic. Uses: In phthisis, wasting diseases, debility. Dose: 8 to 16 Cc. (2 to 4 fluidrams).

Emulsio Olei Morrhuae cum Calcii Lactophosphatis.—"Emulsion of Cod-Liver Oil with Calcium Lactophosphate."

Composition: Cod-Liver Oil, 464 Gm.; Acacia, 116 Gm.; Calcium Lactate, 35 Gm.; Phosphoric Acid (85%), 20 Gm.; Syrup of Tolu, 100 Cc.; Flavoring, as selected; Water, enough to make 1,000 Cc. Med. Properties: Alterative, Tonic, Nutrient. Uses: In phthisis, wasting diseases, debility. Dose: 8 to 16 Cc. (2 to 4 fluidrams).

Emulsio Olei Morrhuae cum Calcii Phosphatis.—"Emulsion of Cod-Liver Oil with Calcium Phosphate."

Composition: Cod-Liver Oil, 464 Gm.; Acacia, 116 Gm.; Calcium Phosphate, 35 Gm.; Syrup of Tolu, 100 Cc.; Flavoring, as selected; Water, enough to make 1,000 Cc. Med. Properties: Alterative, Tonic, Nutritive. Uses: In phthisis, wasting diseases, debility. Dose: 8 to 16 Cc. (2 to 4 fluidrams).

Emulsio Olei Morrhuae cum Extracto Malti.—"Emulsion of Cod-Liver Oil with Extract of Malt."

Composition: Cod-Liver Oil, 500 Cc.; Mucilage of Dextrin, 125 Cc.; Extract of Malt, 375 Cc. Med. Properties: Alterative, Tonic, Nutrient, Amylolytic. Uses: In phthisis, wasting diseases, malnutrition. Dose: 8 to 16 Cc. (2 to 4 fluidrams).

Emulsio Olei Morrhuae cum Hypophosphitis.—"Emulsion of Cod-Liver Oil with Hypophosphite."

Composition: Cod-Liver Oil, 464 Gm.; Acacia, 116 Gm.; Any soluble Hypophosphite, 17.5 Gm.; Syrup of Tolu, 100 Cc.; Flavoring, as selected; Water, enough to make 1,000 Cc. Med. Properties: Alterative, Tonic, Nutritive. Uses: In phthisis, wasting diseases, debility. Dose: 8 to 16 Cc. (2 to 4 fluidrams).

Emulsio Phosphatica.—"Phosphatic Emulsion."

Composition: Cod-Liver Oil, 250 Cc.; Glycerite of Yolk of Egg,

165 Gm.; Diluted Phosphoric Acid, 50 Cc.; Oil of Bitter Almond, 1.5 Cc.; Jamaica Rum, 250 Cc.; Orange Flower Water, enough to make 1,000 Cc. Med. Properties: Alterative, Tonic, Stimulant, Nutritive. Uses: In phthisis, general debility, coughs. Dose: 8 to 16 Cc. (2 to 4 fluidrams).

Extractum Malti (U. S. P. 1880).—"Extract of Malt."

From Malted Barley with water; concentrated to the consistence of thick honey. Med. Properties: Tonic, Laxative, Nutritive. Uses: In convalescence, dyspepsia, and as a nutrient. Dose: 4 to 16 Cc. (1 to 4 fluidrams), or more.

Extractum Malti Fluidum.—"Fluid Extract of Malt."

From 1,000 Gm. of Malted Barley with a mixture of 1 volume of Alcohol and 3 volumes of Water. Med. Properties: Tonic, Laxative, Nutritive. Uses: Principally as adjuvant to tonics and other remedies. Dose: 4 to 16 Cc. (1 to 4 fluidrams), or more.

Extractum Sterculiae Fluidum.—"Fluid Extract of Kola."

From the seeds of Sterculia acuminata, R. Brown, with a mixture of Alcohol, 250, Water, 685, and Glycerin, 65 volumes. Med. Properties: Tonic, Cerebral Stimulant, Diuretic. Uses: In general debility, as a sustainer in mucular exertion, etc. Dose: 1 to 4 Cc. (15 to 60 minims).

Lac Fermentum.—"Koomyss."

Composition: Cow's Milk, fermented with Yeast in the presence of 3.5 per cent of Sugar. Med. Properties: Stimulant Dietetic. Uses: As a nutrient and stimulant. Dose: 120 to 180 Cc. (4 to 6 fluidounces).

Liquor Acidi Phosphorici Compositum.—"Solution of Acid Phosphates."

Composition: A solution obtained by digesting 1,000 Gm. of Bone Ash in a mixture of 780 Gm. of Sulphuric Acid and 4,000 Cc. of Water. Med. Properties: Refrigerant, Tonic, Diuretic. Uses: In dyspepsia, fevers, diabetes, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Liquor Ferri Protochloridi.—"Solution of Ferrous Chlorid."

Composition: Iron Wire, 160 Gm.; Hydrochloric Acid, 625 Gm.; Glycerin, 250 Cc.; Diluted Hypophosphorous Acid, 10 Cc.; Distilled Water, enough to make 1,000 Cc. Med. Properties: Tonic, Astringent, Alterative. Uses: In anemia, chlorosis, etc. Dose: 0.3 to 1 Cc. (5 to 15 minims).

Liquor Hypophosphitum.—"Solution of Hypophosphites."

Composition: Calcium Hypophosphite, 35 Gm.; Sodium Hypophosphite, 20 Gm.; Potassium Hypophosphite, 17.5 Gm.; Citric Acid, 16 Gm.; Water, enough to make 1,000 Cc. Med. Properties: Alterative, Nutrient. Uses: In tuberculosis, debility, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Liquor Phosphori.—"Thompson's Solution of Phosphorus."

Composition: Phosphorus, 0.07 Gm.; Absolute Alcohol, 35 Cc.; Spirit of Peppermint, 0.5 Cc.; Glycerin, 64.5 Cc. Med. Properties: Stimulant, Tonic. Uses: In cerebral affections, sexual exhaustion, neuralgia. Dose: 0.5 to 1 Cc. (7 to 15 minims).

Pilulae Metallorum.—"Metallic Pills."

1. Bitter Metallic Pills: Reduced Iron, 1 gr.; Quinin Sulphate, 1 gr.; Strychnin (alkaloid), $^1/_{30}$ gr.; Arsenous Acid, $^1/_{20}$ gr.
2. Aitken's Tonic Pills: Reduced Iron, $^2/_3$ gr.; Quinin Sulphate, 1 gr.; Strychnin (alkaloid), $^1/_{30}$ gr.; Arsenous Acid, $^1/_{30}$ gr.

Pilulae Quadruplices.—"Quatuor Pills."

Composition: Dried Sulphate of Iron, 1 gr.; Quinin Sulphate, 1 gr.; Purified Aloes, 1 gr.; Extract Nux Vomica, ¼ gr.; Extract of Gentian, q. s.

Pulvis Ferri et Quininae Citratis Effervescens.—"Effervescent Citrate of Iron and Quinin."

Composition: 1,000 Gm. contain 10 Gm. (1%) of Soluble Citrate of Iron and Quinin.—Med. Properties: Tonic, Anti-periodic. Uses: In fevers, debility, anemia.

Pulvis Ferri Phosphatis Effervescens.—"Effervescent Phosphate of Iron.

Composition: 1,000 Gm. contain 24 Gm. (2.4%) of Phosphate of Iron.—See Form. 319. Med. Properties: Chalybeate Tonic. Uses: In anemia, debility, convalescence.

Syrupus Calcii Chlorhydrophosphatis.—"Syrup of Chlorhydrophosphate of Lime."

Composition: Precipitated Calcium Phosphate, 17.5 Gm.; Spirit of Lemon, 20 Cc.; Hydrochloric Acid, Water, Syrup, of each enough to make 1,000 Cc. Med. Properties: Alterative, Tonic. Uses: In tuberculosis, wasting diseases, debility, rachitis. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Syrupus Calcii Hypophosphitis.—"Syrup of Hypophosphite of Lime."

Composition: Calcium Hypophosphite, 35 Gm.; Citric Acid, 1.5 Gm.; Sugar, 775 Gm.; Water, enough to make 1,000 Cc. Med. Properties: Tonic, Alterative, Nutrient. Uses: In tuberculosis, debility, rachitis. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Syrupus Calcii Lactophosphatis cum Ferro.—"Syrup of Lacophosphate of Lime with Iron."

Composition: Lactate of Iron, Potassium Citrate, of each 8.5 Gm.; Water, 60 Cc.; Syrup of Calcium Lactophosphate, enough to make 1,000 Cc. Med. Properties: Alterative, Tonic, Nutrient. Uses: In phthisis, debility, rachitis. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Syrupus Ferri Arsenatis.—"Syrup of Arsenate of Iron."

Composition: Sodium Arsenate, 0.40 Gm.; Citrate of Iron, 0.35 Gm.; Water, 30 Cc.; Syrup, 970 Cc. Med. Properties: Tonic, Alterative, Antiperiodic. Uses: In skin diseases, fevers, chorea. Dose: 0.2 to 0.5 Cc. (3 to 8 minims).

Syrupus Ferri Bromidi (U. S. P. 1880).—"Syrup of Bromid of Iron."

Composition: Bromin, 75 Gm. (Iron Wire, 30 Gm.); Sugar, 600 Gm.; Distilled Water, enough to make 1,000 Cc. Med. Properties: Tonic, Alterative, Antiseptic. Uses: In scrofula, amenorrhea, leucorrhea, phthisis. Dose: 1 to 4 Cc. (15 to 60 minims).

Syrupus Ferri Citro-Iodidi.—"Tasteless Syrup of Iodid of Iron."

Composition: Iodin, 59 Gm. (Iron Wire, 28.5 Gm.); Potassium Citrate, 88 Gm.; Sugar, 650 Gm.; Water, enough to make 1,000 Cc.

Med. Properties: Tonic, Alterative. Uses: In scrofula, chlorosis, anemia. Dose: 0.6 to 2 Cc. (10 to 30 minims).

Syrupus Calcii et Sodii Hypophosphitum.—"Syrup of Hypophosphite of Lime and Soda."

Composition: Calcium Hypophosphite, Sodium Hypophosphite, of each 35 Gm.; Citric Acid, 1.5 Gm.; Sugar, 775 Gm.; Water, enough to make 1,000 Cc. Med. Properties: Alterative, Nutrient. Uses: In tuberculosis, wasting diseases, rachitis, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Syrupus Ferri et Mangani Iodidi.—"Syrup of Iodid of Iron and Manganese."

Composition: Iodin, 81.5 Gm. (Iron Wire, 26.6 Gm.; Manganese Sulphate, 26.5 Gm.; Potassium Iodid, 31.5 Gm.); Sugar, 775 Gm.; Distilled Water, enough to make 1,000 Gm. Med. Properties: Tonic, Alterative. Uses: In anemia, chlorosis, scrofula, etc. Dose: 0.6 to 2 Cc. (10 to 30 minims).

Syrupus Ferri Hypophosphitis.—"Syrup of Hypophosphite of Iron."

Composition: Hypophosphite of Iron, 17.5 Gm.; Potassium Citrate, 25 Gm.; Orange Flower Water, 65 Cc.; Syrup, enough to make 1,000 Cc. Med. Properties: Tonic, Alterative, Nutrient. Uses: In tuberculosis, rachitis, debility, anemia. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Syrupus Ferri Lactophosphatis.—"Syrup of Lactophosphate of Iron."

Composition: Lactate of Iron, 17.5 Gm.; Phosphoric Acid, sufficient for solution in Water, 30 Cc.; Syrup, enough to make 1,000 Cc. Med. Properties: Tonic, Alterative. Uses: In tuberculosis, rachitis, debility, anemia. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Syrupus Ferri Protochloridi.—"Syrup of Ferrous Chlorid."

Composition: Solution of Ferrous Chlorid (Form. 222), 50 Cc.; Glycerin, Orange Flower Water, of each 125 Cc.; Syrup, 700 Cc. Med. Properties: Tonic, Astringent, Alterative. Uses: As a general chalybeate tonic, in anemia, chlorosis, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Syrupus Ferri Saccharati Solubilis.—"Syrup of Soluble Oxid of Iron."

Composition: Moist Ferric Oxid from 80 Gm. Solution of Chlorid of Iron dissolved by the aid of Sugar, 300 Gm., and Solution of Soda, added drop by drop, in sufficient Syrup to make 1,000 Gm. Med. Properties: Tonic, Astringent, Alterative. Uses: In anemia, chlorosis, scrofula, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Syrupus Phosphatum Compositus.—"Chemical Food."

Composition: Precipitated Calcium Carbonate, 35 Gm.; Soluble Ferric Phosphate, Ammonium Phosphate, of each 17.5 Gm.; Potassium Bicarbonate, Sodium Bicarbonate, of each 4 Gm.; Citric Acid, 60 Gm.; Glycerin, 65 Cc.; Phosphoric Acid (50%), Orange Flower Water, of each 125 Cc.; Tincture of Cudbear (to color), 16 Cc.; Sugar, 525 Gm.; Water, enough to make 1,000 Cc. Med. Properties: Alterative, Tonic, Nutrient. Uses: In tuberculosis, chlorosis, anemia, debility. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Syrupus Hypophosphitum Compositus.—"Compound Hypophosphites."

Composition: Calcium Hypophosphite, 35 Gm.; Potassium Hypo-

phosphite, Sodium Hypophosphite, of each 17.5 Gm.; Hypophosphite of Iron, Manganese Hypophosphite, of each 2.25 Gm.; Potassium Citrate, 5 Gm.; Citric Acid, 2 Gm.; Quinin Hydrochlorate, 1.125 Gm.; Tincture of Nux Vomica, 22 Cc.; Sugar, 775 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Alterative, Nutrient, Tonic. Uses: In tuberculosis, rachitis, debility. Dose: 4 to 8 Cc. (1 to 2 fluidrams). Note: This Syrup must not be confounded with the "Syrup of the Hypophosphites," U. S. P. It is not perfectly clear, and must be shaken.

Syrupus Sodii Hypophosphitis.—"Syrup of Sodium Hypophosphite."

Composition: Sodium Hypophosphite, 35 Gm.; Citric Acid, 1.5 Gm.; Sugar, 775 Gm.; Water, enough to make 1,000 Cc. Med. Properties: Alterative, Nutrient, Tonic. Uses: In tuberculosis, wasting diseases, scrofula. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Tinctura Ferri Chloridi Aetherea.—"Bestucheff's Tincture."

Composition: Solution of Chlorid of Iron, 45 Cc.; Ether, 250 Cc.; Alcohol, 705 Cc. Med. Properties: Tonic, Astringent. Uses: In chlorosis, anemia, etc. Dose: 0.65 to 2 Cc. (10 to 30 minims).

Tinctura Ferri Citro-Chloridi.—"Tasteless Tincture of Iron."

Composition: Solution of Chlorid of Iron, 250 Gm.; Sodium Citrate, 460 Gm.; Alcohol, 160 Cc.; Water, enough to make 1,000 Cc. Med. Properties: Tonic, Astringent. Uses: In chlorosis, anemia, erysipelas, etc. Dose: 0.65 to 2 Cc. (10 to 30 minims).

Tinctura Ferri Pomata.—"Tincture of Crude Malate of Iron."

Composition: Ferrated Extract of Apples (Form. 156), 100 Gm.; Alcohol, 100 Cc.; Cinnamon Water, enough to make 1,000 Cc. Med. Properties: Alterative, Tonic, Hematic. Uses: In anemia, chlorosis, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Vinum Carnis.—"Beef and Wine."

Composition: Extract of Beef, 35 Gm.; Hot Water, 60 Cc.; Sherry Wine, enough to make 1,000 Cc. Med. Properties: Nutritive, Stimulant. Uses: In malnutrition. Dose: 8 to 16 Cc. (2 to 4 fluidrams).

Vinum Carnis et Ferri.—"Beef, Wine and Iron."

Composition: Extract of Beef, 35 Gm.; Tincture of Citro-Chlorid of Iron (Form. 407), 35 Cc.; Hot Water, 60 Cc.; Sherry Wine, enough to make 1,000 Cc. Med. Properties: Nutritive, Tonic, Stimulant. Uses: In malnutrition, debility. Dose: 8 to 16 Cc. (2 to 4 fluidrams).

Vinum Carnis, Ferri et Cinchonae.—"Beef, Wine, Iron and Cinchona."

Composition: Extract of Beef, 35 Gm.; Tincture of Citro-Chlorid of Iron (Form. 407), 35 Cc.; Quinin Sulphate, 2 Gm.; Cinchonidin Sulphate, 1 Gm.; Citric Acid, 0.75 Gm.; Hot Water, 60 Cc.; Angelica Wine, enough to make 1,000 Cc. Med. Properties: Nutritive, Tonic, Stimulant. Uses: In malnutrition, convalescence from fevers. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Uterine Stimulants, Tonics and Anodynes.

Elixir Apii Graveolentis Compositum.—"Compound Elixir of Celery."

Composition: Fluid Extract Celery Seed, Fluid Extract Coca,

Fluid Extract Kola, Fluid Extract Black Haw Bark, of each 62 Cc.; Alcohol, 125 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Med. Properties: Nerve Tonic, Cerebral Stimulant, Antispasmodic, Diuretic. Uses: In dysmenorrhea, menorrhagia, uterine debility, and kindred affections. Dose: 4 to 16 Cc. (1 to 4 fluidrams).

Elixir Viburni Opuli Compositum.—"Compound Elixir of Crampbark."

Composition: Fluid Extract of Crampbark, Fluid Extract of Aletris, of each 75 Cc.; Fluid Extract of Trillium, 150 Cc.; Compound Elixir of Taraxacum, 700 Cc. Med. Properties: Antispasmodic, Tonic, Carminative. Uses: In nervous diseases of pregnancy, dysmenorrhea, menorrhagia, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Elixir Viburni Prunifolii.—"Elixir of Black Haw."

Composition: Fluid Extract of Black Haw, 125 Cc.; Compound Tincture of Cardamom, 75 Cc.; Aromatic Elixir, 800 Cc. Med. Properties: Antispasmodic, Tonic. Uses: In ovarian irritation, dysmenorrhea, menorrhagia, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Extractum Aletridis Fluidum.—"Fluid Extract of Stargrass."

From the rhizome of Aletris farinosa, L., with Diluted Alcohol. Med. Properties: Emmenagogue, Alterative, Tonic. Uses: In amenorrhea, dysmenorrhea, menorrhagia, leucorrhea, etc. Dose: 2 to 4 Cc. (one-half to one fluidram).

Extractum Caulophylli Fluidum.—"Fluid Extract of Blue Cohosh."

From the rhizome and rootlets of Caulophyllum thalictroides, Mich., with a mixture of 3 volumes of Alcohol and 1 volume of Water. Med. Properties: Diuretic, Diaphoretic, Emmenagogue, Antispasmodic. Uses: In amenorrhea, dropsy, epilepsy. Dose: 0.5 to 2.0 Cc. (8 to 30 minims).

Pilulae Ferri Compositae (U. S. P., 1880).—"Compound Pills of Iron."

Myrrh, 1½ grains; Sodium Carbonate, 3-4 grain; Sulphate of Iron, 3-4 grain.

Pilulae Galbani Compositae (U. S. P., 1880).—"Compound Galbanum Pills."

Galbanum, 1½ grains; Myrrh, 1½ grains; Asafetida, ½ grain.

Pulvis Aloes et Canellae.—"Hiera Picra."

Composition: Purified Aloes, 80 Gm.; Canella, 20 Gm. Med. Properties: Purgative, Stimulant. Uses: In uterine disorders. Dose: 1 to 2 Gm. (15 to 30 grains).

Tinctura Antacrida.—"Fenner's Guaiac Mixture."

Composition: Corrosive Chlorid of Mercury, 5.5 Gm.; Guaiac, Canada Turpentine, of each 125 Gm.; Oil of Sassafras, 30 Cc.; Alcohol, enough to make 1,000 Cc. Med. Properties: Antiseptic, Emmenagogue. Uses: In dysmenorrhea. Dose: 0.6 to 1.2 Cc. (10 to 20 minims).

Tinctura Guaiaci Composita.—"Dewees' Tincture of Guaiac."

Composition: Guaiac, 125 Gm.; Potassium Carbonate, 6 Gm.; Pimenta, 30 Gm.; Diluted Alcohol, enough to make 1,000 Cc. Med.

Properties: Alterative, Emmenagogue. Uses: In painful menstruation. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Tinctura Viburni Opuli Composita.—"Compound Tincture of Viburnum."

Composition: Viburnum Opulus, Dioscorea, of each 35 Gm.; Scullcap, 10 Gm.; Cloves, 50 Gm.; Cinnamon, 65 Gm.; Glycerin, 65 Cc.; Alcohol, 750 Cc.; Alcohol, 5 vols., Water, 1 vol., enough to make 1,000 Cc. Med. Properties: Antispasmodic, Carminative, Tonic. Uses: In nervous diseases of pregnancy, painful menstruation, etc. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Vinum Fraxini Americanae.—"Wine of American Ash."

Composition: Fraxinus Bark, 500 Gm.; Stronger White Wine (Form. 440), enough to make 1,000 Cc. Med. Properties: Alterative, Tonic, Emmenagogue. Uses: In dysmenorrhea. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

VEHICLES AND CORRECTIVES.

Elixir Adjuvans.—"Adjuvant Elixir."

Composition: Sweet Orange Peel, 75 Gm.; Wild Cherry Bark, 150 Gm.; Russian (peeled) Licorice Root, 300 Gm.; Coriander, Caraway, of each 40 Gm.; Syrup, 1,500 Cc.; Alcohol, 1 vol., Water, 2 vols., of each enough to make 5,000 Cc. Uses: Chiefly as a vehicle for bitter or nauseous remedies, and particularly if acrid or saline.

Elixir Curassoa.—"Curaçoa Cordial."

Composition: Spirit of Curaçoa, 16 Cc.; Orris Root, 4 Gm.; Citric Acid, 7 Gm.; Deodorized Alcohol, 250 Cc.; Syrup, 500 Cc.; Water, enough to make 1,000 Cc. Uses: Internally, as an adjuvant and dilutent.

Elixir Eriodictyi Aromaticum.—"Aromatic Elixir of Yerba Santa."

Composition: Fluid Extract of Eriodictyon ("Yerba Santa"), 62.5 Cc.; Magnesium Carbonate, 11 Gm.; Syrup, 500 Cc.; Compound Elixir of Taraxacum, enough to make 1,000 Cc. Uses: As a vehicle for quinin and other bitter remedies.

Elixir Glycyrrhizae.—"Elixir of Licorice."

Composition: Fluid Extract of Licorice, 125 Cc.; Aromatic Elixir, 875 Cc. Uses: As adjuvant, and vehicle for bitter remedies.

Elixir Glycyrrhizae Aromaticum.—"Aromatic Elixir of Licorice."

Composition: Fluid Extract of Licorice, 125 Cc.; Oil of Cloves, Oil of Cinnamon, of each 0.4 Cc.; Oil of Nutmeg, 0.25 Cc.; Oil of Fennel, 0.75 Cc.; Aromatic Elixir, enough to make 1,000 Cc. Uses: As adjuvant, and vehicle for bitter or nauseous remedies.

Elixir Taraxaci Compositum.—"Compound Elixir of Taraxacum."

Composition: Fluid Extract of Taraxacum, 35 Cc.; Fluid Extract of Wild Cherry, 20 Cc.; Fluid Extract of Licorice, Tincture of Sweet Orange Peel, of each 60 Cc.; Tincture of Cinnamon, 35 Cc.; Compound Tincture of Cardamom, 30 Cc.; Aromatic Elixir, 800 Cc. Uses: As a corrigent, to cover the bitter taste of quinin and similar remedies.

Glyceritum Tragacanth.—"Glycerite of Tragacanth."

Composition: Tragacanth, 125 Gm.; Glycerin, 775 Cc.; Water,

185 Cc. Med. Properties: Demulcent. Uses: Chiefly as an emulsifying agent, and to suspend heavy powders in mixtures.

Infusum Rosae Compositum.—"Compound Infusion of Rose."

Composition: Red Rose, 13 Gm.; Diluted Sulphuric Acid, 9 Cc.; Sugar, 40 Cc.; Boiling Water, 1,000 Cc. Med. Properties: Astringent, Refrigerant. Uses: As an addition to gargles, in night sweats, etc.

Liquor Extracti Glycyrrhizae.—"Solution of Extract of Licorice."

Composition: Purified Extract of Licorice (Form. 158), equivalent to 250 Gm. of dry Extract, 250 Gm.; Alcohol, 125 Cc.; Glycerin, 250 Cc.; Water, enough to make 1,000 Cc. Uses: As a convenient substitute for ordinary Extract of Licorice in mixtures.

Oleosacchara.—"Oil Sugars."

Composition: Any Volatile Oil—Lemon, Peppermint, Anise, and the like—1 drop; Sugar, 2 Gm. Uses: As an aromatic adjuvant to powders, and as dusting powders for pills.

Spiritus Aromaticus.—"Aromatic Spirit."

Composition: Compound Spirit of Orange (U. S. P.), 65 Cc.; Deodorized Alcohol, 935 Cc. Uses: As a flavoring for Elixirs, Syrups, and similar preparations.

Spiritus Cardamomi Compositus.—"Compound Spirit of Cardamom."

Composition: Oil of Cardamom, 2 Cc.; Oil of Caraway, 0.75 Cc.; Oil of Cinnamon, 0.5 Cc.; Alcohol, 500 Cc.; Glycerin, 65 Cc.; Water, enough to make 1,000 Cc. Uses: As a flavoring, and as a substitute for the official Compound Tincture of Cardamom when the coloring matter of the latter is undesirable.

Syrupus Coffeae.—"Syrup of Coffee."

Composition: Roasted Coffee, 250 Gm.; Sugar, 750 Gm.; Water, enough to make 1,000 Cc. Med. Properties: Cerebro-spinal Stimulant, Diuretic. Uses: Principally as an adjuvant and vehicle. Dose: 4 to 16 Cc. (1 to 4 fluidrams) or more.

Syrupus Cinnamomi.—"Syrup of Cinnamon."

Composition: Cinnamon, 100 Gm.; Alcohol, 50 Cc.; Sugar, 700 Gm.; Cinnamon Water, enough to make 1,000 Cc. Med. Properties: Aromatic, Carminative, Antiseptic. Uses: As an adjuvant to diarrhea mixture. Dose: 4 to 8 Cc. (1 to 2 fluidrams).

Tinctura Vanillini Composita.—"Compound Essence of Vanillin."

Composition: Vanillin, 6.5 Gm.; Cumarin, 0.4 Gm.; Alcohol, 200 Cc.; Glycerin, Syrup, of each 125 Cc.; Compound Tincture of Cudbear (Form. 419), 16 Cc.; Water, enough to make 1,000 Cc. Uses: As a flavoring.

VERMIFUGES.

Infusum Brayerae (U. S. P., 1880).—"Infusion of Kousso."

Composition: Brayera, 60 Gm.; Boiling Water, 1,000 Cc. Med. Properties: Taenifuge. Uses: For the expulsion of tapeworms. Dose: 120 Cc. (4 fluidounces), repeated in one hour.

Trochisci Sodii Santoninatis (U. S. P., 1880).—"Santoninate of Soda Troches."

Composition: Sodium Santoninate, 6.50 Gm.; Sugar, 130 Gm.;

Tragacanth, 3.75 Gm.; Orange Flower Water, enough to make 100 Troches. Med. Properties: Vermifuge. Uses: For the destruction of lumbricoid worms. Dose: One or more, according to circumstances.

POULTICES AND OTHER COUNTERIRRITANTS.

Counterirritants are applications made to the skin for the relief of pain and inflammation.

Flaxseed Poultice.—This is made by stirring up flaxseed meal to the consistency of hasty pudding. Spread it in a thick layer on muslin and cover the surface with cheesecloth or gauze. Apply as hot as possible and cover with "rubber dam" such as dentists use, oiled silk, oilcloth, or several folds of toweling or dry flannel to retain the heat. Change every three or four hours, *quickly*, under cover, being careful not to expose and chill the skin. A little mustard may be added if you want it more stimulant.

Cornmeal Poultice.—May be made from cornmeal as above, in case flaxseed cannot conveniently be obtained. Apply as above.

Charcoal Poultice.—Powdered charcoal should be sprinkled in a thick layer over the surface of a flaxseed poultice, and applied directly to the diseased part. It is used on suppurating and gangrenous wounds.

Spice Poultice.—This is readily extemporized. Equal quantities of powdered ginger, cloves, cinnamon and allspice are mixed and the resulting powder quilted between layers of gauze. This is dipped in hot water or a weak solution of alcohol or whiskey, laid over the affected part, and covered with flannel or oiled silk to retain the heat. If it is desired to make it more stimulating, a little mustard or capsicum may be added. The spice poultice is useful in the abdominal troubles of infancy.

Mustard Plaster.—Take equal parts of ground mustard and wheat flour or cornmeal and stir into a paste with tepid water. Another excellent way is to mix the mustard smoothly with the white of an egg. Spread on a piece of muslin or paper and cover the surface with gauze or cheesecloth. It should be left on till the skin is well reddened, but should not be allowed to blister. In children, make the mixture very weak—one part of mustard to four to sixteen of flour.

Turpentine Stupes.—A piece of flannel is wrung out of hot water and sprinkled over with a little turpentine. It is applied hot to the skin and covered over with oiled silk or dry flannel to retain the heat. Do not allow to blister.

Hot Fomentations are made by applying to the skin flannel cloths or several folds of gauze wrung out of water as hot as can be borne. Cover with rubber, oiled silk or flannel and put on a hot-water bag to retain the warmth. In changing, do not permit the skin to be uncovered so as to chill the surface.

Dry Heat may be applied by means of hot-water bags, hot salt or sand bags, hot bricks, stove lids or plates, bottles with hot water, or by the application of hot flannel cloths. Always use flannel next the skin, between it and the heated object.

Liniments.—These are useful counter-irritants in many painful conditions. The following formula will always be found reliable and efficient:

Oil Anise	dr. ½
Oil Origanum	dr. 1½
Oil Cloves	dr. 3
Oil Sassafras	oz. 1
Ammonia Water	oz. 1
Chloroform	dr. 3
Alcohol, enough to make	oz. 8

Kemp recommends the following in sciatica, intercostal neuralgia, etc.:

Oil Mustard	m. 10
Menthol	gr. 10
Alcohol (95 per cent)	oz. 1

Blisters.—Cantharides is usually employed to produce a blister. This may be employed in the form of a plaster (emplastrum cantharidis) or in a liquid, which is painted on with a camel's-hair brush (cantharidal collodion). Proprietary manufacturers now furnish very active, ready-spread plasters, which blister in five or six hours; the old blister plaster frequently required twelve. First wash the skin carefully and apply the plaster. After it is removed, puncture the blister at the most dependent portion and apply a bland oil or vaseline. If it is desired to cause free serous discharge, the action may be prolonged by hot poulticing.

Cupping.—Cupping glasses are used, from which the air is exhausted by burning a few drops of alcohol inside. The glass is now applied to the skin, which rises within the glass to fill the vacuum. An ordinary wine glass may be used. More convenient are the glasses supplied with stopcocks and meant to be exhausted with a suction pump. In wet cupping the skin is first scarified before applying the cup; this causes blood to be withdrawn into the glass.

Leeches.—The skin must be scrupulously clean and absolutely free from soap. The leech should be held by the large end between folds of cotton or lint, while the smaller end or head is applied to the surface from which it is desired to extract blood. If it is slow to take hold, the skin may be smeared with a little fresh blood or sweet milk, or it may be placed in a little warm water. The leech should be allowed to hang on until it is full, when it will detach itself. Do not apply leeches over important blood-vessels. Leech tubes, to be purchased of any instrument dealer, should be used if the leech is to be applied within a cavity. Bleeding may be continued by applying warm, wet compresses. If this is not desired, dress the bite antiseptically, or close with collodion.

POISONS AND THEIR ANTIDOTES.

In case of poisoning, give an emetic at once. Ground mustard is usually at hand, and is very effective; give one or two teaspoonfuls stirred up in warm water, and repeat in a few minutes if vomiting does not result; common salt dissolved in warm water is also a good emetic. If the poison is a mineral acid (muriatic, nitric or sulphuric), or a caustic alkali (lye, caustic soda or caustic potash), omit the emetic and give at once the proper antidote to neutralize the acid or caustic and stop its "eating."

In the list of remedies below the most useful are printed in italics:

POISONS.	ANTIDOTES AND TREATMENT.
ACIDS—Muriatic, nitric and sulphuric.	*Ordinary baking soda* in water or milk; *chalk; magnesia; plaster*, scraped from the wall; *soapsuds;* milk; eggs. Follow with olive oil, linseed oil, flaxseed tea or mucilage.
ALKALIES—Lye, caustic potash, caustic soda.	*Vinegar; lemon juice;* acid fruit juices; *olive oil; linseed oil; cottonseed oil;* butter; cream; milk.
ACONITE.	*Stimulants; heat to body and limbs; atropin; digitalis;* strychnin; ammonia.
ARSENIC—Paris Green, "Rough on Rats."	*Hydrated oxid of iron;* dialyzed iron; magnesia; stimulants; flaxseed and other mucilaginous drinks; castor oil to empty bowels.
BELLADONNA.	*Tannic acid or large amount of tea or coffee; opium or morphin;* stimulants; vigorous friction and slapping of skin; artificial heat to body and limbs.
CARBOLIC ACID.	*Alcohol* is an efficient antidote; *Epsom salt or Glauber's salt; soapsuds.* Follow with *white of egg, mucilage* or *flaxseed tea.* Emetic should follow antidote, but precede mucilaginous drinks.
CHLORAL.	*Atropin; strychnin; strong coffee;* friction and artificial heat; artificial respiration if necessary.
CHLOROFORM.	*Artificial respiration; atropin; digitalis;* stimulants; ammonia.
COCAIN.	*Recumbent position; alcoholic stimulants;* ammonia; *black coffee; strychnia;* friction and artificial heat.
COPPER SULPHATE—"Blue Vitriol."	*White of egg; magnesia;* mucilaginous drinks.
CORROSIVE SUBLIMATE.	*White of egg; milk; wheat flour.* After taking sufficient antidote, empty stomach and take flaxseed tea or bland oils.

CROTON OIL.	Mucilaginous drinks; opium.
DIGITALIS	*Recumbent posture; aconite; stimulants;* friction and artificial heat.
IODIN.	*Starch or flour in water;* mucilaginous drinks.
LEAD SALTS—Sugar of Lead.	*Epsom or Glauber's salt; sodium phosphate or Hunyadi water,* followed by emetic. White of egg; milk; opium for pain and irritation.
LOBELIA.	*Tannic acid, as in tea and coffee; stimulants;* heat to body and limbs.
NITRATE OF SILVER—Lunar Caustic.	*Common salt* in water, drank freely. Mucilaginous drinks, as linseed tea.
OPIUM—Morphin.	*Permanganate of potash; atropin; black coffee;* stimulants; cold water poured on head and shoulders, slapping with wet towels, compulsory exercise and electric battery to keep patient awake if possible; artificial respiration if necessary.
OXALIC ACID.	*Lime or whitewash,* scraped from the wall if necessary, in water; chalk; magnesia. Ipecac best emetic. Do not give potash or soda.
PHOSPHORUS—Heads of matches, rat paste.	*Blue vitriol chemical antidote and best emetic,* 2 to 3 grains every five minutes till vomiting. *Magnesia; old acid turpentine.* Epsom salts as purgative. *Give no fats or oils.*
PRUSSIC ACID—Hydrocyanic Acid.	*Atropin;* cold water poured on head and spine; *ammonia* inhaled and internally; *stimulants;* artificial respiration.
SNAKE BITES.	*Ligature around limb* to prevent poison entering body except slowly; *wound opened* to promote bleeding; *poison sucked out* or cauterization; *injection 1 per cent solution permanganate of potash* or tincture of iodin; free use but not abuse of *stimulants;* digitalis.
STRYCHNIN—Nux Vomica.	Repeated doses of *tannic acid—tea or coffee; inhalations of chloroform* for spasms; large doses of *chloral and bromids; morphin; absolute quiet.*
TARTAR EMETIC—Antimony.	*Tannic acid* as in *strong tea or coffee; white of egg;* milk; *flaxseed tea;* dry heat to body and extremities; stimulants.
ZINC SALTS.	*Lime water; sodium carbonate; tannic acid; soapsuds;* milk; mucilaginous drinks.

FOOD FOR THE SICK.

General Directions.—Food should never be prepared in a sick room, as the mere sight or smell of it often destroys the appetite; nor should it ever be kept there, for the same reason.

Whenever possible, prepare every dish fresh when needed and serve as soon as cooked, when convenient and suitable. Consult the patient's taste and known likes and dislikes. Plan little surprises to tempt the appetite. See that the food is served in an attractive manner with the daintiest china and cleanest linen.

Alternate the dishes so as to secure some variety; do not, as a rule, give various kinds of food and drink at the same time. Be regular about the meals. In the more serious acute diseases, nourishment is required at short intervals, and is especially necessary at night and the early morning hours.

In fevers, as a rule, the food should be mainly liquid, principally of milk and the dishes prepared from it, fruits and the meat broths. Thirst is best relieved by cracked ice and acid drinks.

For nausea, ice, cold milk and mucilaginous drinks are usually most useful. In the vomiting of children it is often necessary to give up the milk and depend upon barley water and meat juice for food and drink.

During convalescence a more liberal diet may be adopted, but it should at first be largely liquid, as too early and free indulgence in solid food may cause a relapse.

Recipes.

Lemonade.—Pare the rind thinly from one lemon and cut it into thin slices. Put the peel and sliced lemon into a pitcher with one ounce of sugar. Pour on one pint of boiling water; cover, let stand and strain before using. It may be taken either hot or cold. Hot lemonade is an excellent remedy for colds. Cool lemonade is a very agreeable drink when feverish.

Egg Lemonade.—Put the rinds of two lemons, pared thin, and a quarter to half a pound of sugar in a pitcher or jar and pour on a pint and a half of boiling water. Cover tight, cool, strain and add one-half pint of sherry wine, the juice of four lemons and four eggs, well beaten. Mix thoroughly. A cooling, stimulating and nutritious beverage.

Barley Water.—Take two ounces of pearl barley, wash it well with cold water, throwing away the washings; boil five minutes in fresh water, and pour off again. Now add a pint more of fresh water and boil down slowly to one pint.

It is used to dilute the baby's milk when it causes indigestion or vomiting, or as a temporary substitute for milk and other foods. It is a pleasant, nutritious invalid drink for adults, and as such may be flavored with lemon juice or lemon rind.

Toast Water.—Toast a thin slice of bread till all moisture is driven out and it is well browned, but not burned. Pour over it enough boiling water to cover it well, and let it stand an hour or more in a covered dish.

A slightly nutritious drink, good for the digestive troubles of young children.

Rice Water.—Steep an ounce of rice for three hours in a quart of water. Let it simmer slowly and gradually raise to the boiling point. Strain and let cool before using.

A valuable drink in diarrhea, dysentery and other troubles of stomach and bowels.

Oatmeal Water.—Put two tablespoonfuls of oatmeal in a quart of cold water. Let it stand an hour or two in a cool place, then pour off as desired.

A very nourishing mucilaginous drink; nothing better to relieve thirst. Very useful for harvesters, firemen and all others working in extreme heat.

Flaxseed Tea.—Take half a cup of flaxseed and one quart of boiling water. Boil half an hour and let it stand near the fire to thicken. If desired, a little powdered licorice root may be mixed with the flaxseed before adding hot water. Strain and add the juice of four lemons and sugar or honey to suit the taste.

Excellent for coughs and colds and whenever a mucilaginous drink is desired.

Jelly Water.—A pleasant drink for invalids is made from currant or other acid jellies by adding hot or cold water.

Milk.—No food is so universally useful during sickness as milk, and, if of good quality and due regard is given to the peculiarities of the patient, it will usually prove the most satisfactory of anything in the dietary. Care should be taken to secure milk from healthy animals, clean, fresh and free from disagreeable odors. It may be given either hot or cold. Hot milk is apparently absorbed very rapidly, is more digestible, and in cases of fatigue, exhaustion and insomnia gives a sense of comfort and promotes sleep. Cold milk is particularly useful in nausea and irritability of the stomach. If desired by the patient, the taste may be altered by adding a little salt, tea, coffee, cocoa or spirits. Some prefer skimmed milk or milk diluted with carbonated water, Apollinaris, Vichy or other aërated or alkaline waters. Milk is especially useful in fevers (particularly typhoid), digestive troubles of various kinds, nervous prostration, Bright's disease, rheumatism and gout. It is a suitable food for nearly every acute or chronic disease.

It may be given as above or in some of the milk foods following:

Sterilized and Pasteurized Milk.—Milk that has been exposed long to the air contains microbes or germs, which during the hot weather multiply rapidly and cause indigestion and diarrhea, espe-

cially in children, during the summer months. To inhibit the growth of these germs, milk may be sterilized or pasteurized. Milk is sterized by heating to the boiling point (212 deg. F.). This is best done in a patent sterilizer, in which the milk is placed in bottles, surrounded by hot steam, which is condensed and used over and over again. There are several good and cheap sterilizers on the market. If, however, you feel unable to purchase one of these, the milk may be prepared as follows: Put the milk in clean, scalded bottles, holding enough each for one nursing, and cork with a plug of absorbent cotton. Set these bottles in a pan of water and let the water be brought to boiling, and boil thirty minutes. Then take the bottles out, put in clean, tight stoppers and place on ice or in a cool place till ready to use. Before using it should be warmed by placing the bottles in warm water and a teaspoonful of lime water added to every two ounces of milk. Milk is pasteurized by heating to a temperature of 160 to 170 deg. F. This is sufficient to inhibit the growth of germs and does not produce such decided changes in the milk as sterilization. It is therefore to be preferred to sterilization.

Predigested Milk.—Mix one pint of fresh milk and one gill of cold water in a clean vessel. Stir in a tubeful of Fairchild's peptonizing powder or a teaspoonful of Parke, Davis & Co.'s pancreatic solution and set it in warm (not boiling) water for thirty minutes or till slightly bitter. Then boil for two or three minutes and put on ice or in a cool place till needed. Serve cold with carbonated or aërated water or coffee to cover the taste. This is a useful food when digestion is very weak.

Predigested Milk Gruel.—Take a pint of milk and the same quantity of milk gruel made from barley, arrowroot, oatmeal or wheat flour. Mix and add the peptonizing powder or solution as above. Keep on the side of the stove for two or three hours, then boil briskly for two or three minutes. Strain and put in a cool place till used.

Peptonized Ice-Cream.—This is made by peptonizing a mixture containing one-half pint milk, two ounces (four tablespoonfuls) of cream and a pint of water, as directed above. This is sweetened and flavored to taste and frozen in an ice-cream freezer. It is useful in febrile conditions.

Buttermilk.—A most nourishing and refreshing drink. It is slightly acid and diuretic, promotes activity of the liver and kidneys and clears the complexion. Should be procured fresh and not used when it has "aged."

Home-Made Koumiss.—Mix together one quart of fresh milk, a tablespoonful of sugar and a teaspoonful of yeast (or its equivalent of compressed yeast). Let stand in a warm place for ten hours. Pour from one vessel to another until it is smooth. Then bottle,

leaving room to shake. Cork tightly with patent stoppers or tie down corks with wire or strong cord. Keep in a warm place for twenty-four hours, then put on ice or in a cool place till wanted. Shake once or twice daily. It is very sensitive to temperature and spoils quickly. Koumiss is an agreeable acid drink, slightly bitter and frothing readily. It is good for thirst, very nourishing, improves the complexion and strengthens the heart. Useful in most acute and chronic diseases, especially those of stomach and bowels and where there is lack of nutrition.

Milk and Cinnamon Drink.—Boil a little cinnamon in milk. It may be served warm or cold with a little brandy if needed. It should usually be given to children without the brandy.

It is excellent for diarrhea.

Milk Punch.—Take one part of brandy or whiskey to five or six parts of milk. Add sugar to taste, shake well and grate in a little nutmeg.

Albuminized Milk.—In a covered glass jar put the white of one egg and one cup of milk. Shake until the ingredients are thoroughly blended. Sweeten and flavor to taste. Serve immediately.

Junket.—Take one pint of sweet milk, with sugar to suit the taste. Heat till lukewarm, pour into a shallow dish and add two teaspoonfuls of essence of rennet and a tablespoonful of sherry wine if desired. Stir in well, add nutmeg or cinnamon, and let it stand in a warm room. A slight curd forms. Serve cold. A grateful and nutritious dish, good in typhoid and other fevers.

Lemon Whey.—Heat one cup of milk and add the juice of one small lemon. Cook until curd separates, then strain through cheesecloth. Sweeten to taste. Serve hot or cold.

Wine Whey.—To half a pint of boiling milk in a saucepan add a wineglassful of sherry wine. Let it stand a few minutes and then strain through cheesecloth. Sweeten to taste. It makes a pleasant and nourishing drink in colds and fevers. A tablespoonful may be given a child every two or three hours whenever food and stimulus are required.

Beef Juice.—Boil very slightly a piece of round or sirloin, just enough to sear over the outside and not coagulate the juice. Press out the juice with a lemon squeezer and season to taste. This is a nourishing and stimulating food, useful whenever solid food cannot be taken. Excellent for children when compelled to go without milk.

Beef Juice.—Dr. Futterer of Chicago recommends the following method of preparing beef juice. By this process he secures 6.1 per cent of coagulable proteid as compared with 1.3 per cent obtained by the usual fruit-jar method. This beef juice is very valuable in the treatment of chlorosis. Proceed as follows: "(1) Order five pounds of finely chopped round steak to be brought at 8 a. m. every

morning. The fat should be removed before the beef is chopped. (2) Mix the meat with a teaspoonful of salt, and put it into the upper part of a double boiler. Cover without adding water. (3) Fill the lower part of the boiler with warm (not hot) water. (4) Keep the boiler on a kitchen stove for four hours, keeping the water in the lower part of the boiler just warm, so a hand can be placed on the latter and kept there without burning it. This will do, as a rule, but the use of a thermostat, regulating the temperature to 120 deg. F., gives more uniform results. (5) Turn the beef every hour. (6) Press out the juice with a potato masher, spice, and let patient drink it in two portions, half at dinner, half at supper.

"Five pounds of beef yield about a pint of juice, which will necessarily have to be taken in one portion, at supper, if the patient works during the day."

Beef Extracts.—There are numerous beef extracts on the market from which a palatable beef tea can be made. Beef teas so made are valuable additions to the dietary on account of their stimulating and appetizing quality, but they contain no nourishment, will not support life, and are not foods, but stimulants. The same is true of every meat tea or broth made by boiling or cooking meat. Cooking coagulates or hardens the albumen or nutritive part and the clear juice remaining contains no more nourishment than the water in which an egg has been boiled.

Beef Tea.—Chop fine one pound of lean meat. Allow it to stand in one pint of cold water for two hours. Then let it simmer on the stove three hours more, never boiling. Add water to make one pint. Strain and squeeze out all the juice from the beef. Season to taste. This makes a good beef tea, nourishing as well as stimulating.

Scraped Beef or Beef Pulp.—With a spoon or dull knife, scrape the pulp from a piece of tender raw beef, leaving the fat and fibrous portion. Or, after cutting away all fat and gristle, cut it into small pieces and pulverize in a mortar; then rub through a coarse sieve to break up the fiber and separate the coarser portion. Season with salt and pepper and eat raw, either alone or spread on thin slices of bread or cracker. If the thought of raw meat is very distasteful, it may be made into little balls and slightly seared over on the outside. In certain forms of dyspepsia and in young children who cannot take milk, raw scraped meat is the most useful food.

Mutton Broth.—Take one pound of mutton, trimming off fat and gristle and breaking up the bones. Pack tightly in the soup kettle, cover with cold water and allow to stand until the juice starts. Then add enough water to make a quart and let it boil slowly for two or three hours, adding a tablespoonful of rice when about half done. Skim off fat and season with salt and pepper.

Chicken Broth.—The chicken should be well cut up, all joints

separated and bones broken. Cover with cold water and let stand till juice has started, then add a sufficient quantity of cold water and boil for two hours. Add a tablespoonful of rice when half done. Skim off excess of fat. Season to taste.

Boiled Eggs.—Eggs, like milk, are a nearly perfect food, and when properly cooked are easily digested and suitable for almost any invalid. An egg should never be hard boiled. It may be dropped into hot water and allowed to boil three minutes, which is sufficient to coagulate the albumen. A favorite method is to drop the egg into a kettle of boiling water, cover closely and set to one side, where it will keep hot, but not boil, for eight or ten minutes. In this way the egg is well cooked through, without making it tough.

Poached Eggs.—This is also an excellent way to cook eggs. Break them carefully into boiling, salted water and allow them to cook till the white is coagulated. Remove with a skimmer, being careful not to break the yolk. They may be eaten on toast.

Eggs Poached in Milk.—Take one cup of milk and half a cup of water. Boil and break in six eggs, cooking as above. Season to taste and serve with toast.

Egg Albumin Water Is made by beating up the white of an egg with a little water. It can often be taken when nothing else will be retained by the stomach.

Eggnog.—Beat up one egg with a little sugar. Mix thoroughly with a dessertspoonful of brandy and a sufficient quantity of milk. The milk should be scalded, cooled and stirred in last. Flavor with a little nugmeg or cinnamon.

Raw Oysters.—Like eggs, they consist of nearly pure albumin, and for the same reason require little or no cooking.

For most acute diseases they are not suitable food, but in certain forms of indigestion, anemia, consumption, nervous and general debility, they are most valuable on account of their ease of digestion.

Oyster Soup.—To a quart of oysters add a pint of cold water. Bring to a boil and skim. Take off as soon as it reaches the boiling point. Add one pint of boiling milk, butter, salt and pepper to taste. Serve immediately. It may be thickened with a little flour stirred into a paste with cold water, if desired.

Arrowroot.—Two teaspoonfuls of arrowroot should be mixed into a paste with cold water. Then pour on slowly half a pint of boiling water, stirring well as it thickens. Boil for two or three minutes. Sweeten slightly and flavor with lemon peel or nutmeg if desired; or add sherry wine or brandy if needed. Boiling milk may be used instead of hot water when admissible. Arrowroot is a popular form of diet for children's diarrhea.

Oatmeal Gruel.—Take two teaspoonfuls of oatmeal and half a

teaspoonful of salt. Mix and stir it into one cupful of boiling water, a little at a time, and cook thirty minutes. Strain through wire and add one cupful of boiling hot milk. Serve hot. A teaspoonful of sugar may be added before cooking, if desired.

Cornmeal Gruel.—Mix two teaspoonfuls of cornmeal, one tablespoonful flour, one teaspoonful sugar and one small teaspoonful salt. Stir into one pint of boiling water and cook briskly for thirty minutes. Then add one cup of milk and let it boil up. Serve hot. May be made without sugar.

Milk Porridge.—One and a half tablespoonfuls of flour mixed into a thin paste with cold water is stirred into a quart of boiling milk. Salt to taste. Porridge and the milk gruels are pleasant and easily digested foods, suitable for most feverish conditions and many stomach and bowel troubles.

Dry Toast.—Toasting increases the digestibility of bread, as it partially changes the starch into sugar. The bread should be cut into thin slices and evenly browned on both sides, *not burned.* Butter at once and serve hot.

An excellent breakfast dish, with eggs or a good cereal breakfast food. Good for dyspeptics.

Water Toast.—The bread should be toasted as above, and then dipped in salted water, on which a little butter is floated, absorbing just enough moisture to strike through the slice. Pile in hot toast dish, and when enough has been toasted to take up most of the salted water, pour the remainder on the toast. Do not use enough wetting to make it mushy. Serve hot.

Cream Toast.—The slices should be toasted and moistened with salted water, as for water toast. Put in the hot toast dish and pour over each slice two or three spoonfuls of cream and a little softened or creamed butter.

Zwieback.—This is a thoroughly toasted bread. Usually a well-sweeted bread or "rusk" is used and toasted through and through in a slow oven until all moisture is driven out.

INFANT FEEDING.

The best food for an infant is milk, and if possible it should be nursed at the mother's breast. Babies that have breast milk for the first few months are less likely to contract disease and have more strength to resist it.

The first two or three days the baby should put to the breast four or five times daily. Until the milk comes it needs no food, but a little tepid boiled water, slightly sweetened, may be given if it cries. During the first two or three months of the child's life it should be nursed every two hours during the day and once at night. After that, every three hours is often enough, and it should not be nursed between 11 p. m. and 5 a. m. After the eighth month a

nursing every four hours should be sufficient. If the baby cries between nursings, the stomach should not be overloaded by giving more milk. The stomach needs some time for rest. A little tepid water given with a spoon will usually relieve the thirst and stop the crying.

The baby should be weaned when nine or ten months old, unless this occurs in the summer months; in that case it should be put off until cooler weather. Weaning should not be abrupt—done in a day—but gradually, while replacing the breast milk with other food. Cow's milk should be the principal substitute, and should remain the main article of diet for some time. Gruels, the simple cereals, meat broths, beef juice, eggs, toasted bread, fresh fruits, lean meats, etc., may be added as the child grows older and more accustomed to a mixed diet.

Breast milk does not always agree with young infants. There is a great variation in its quality. When the woman is very young or very old or in poor health it is often scanty, watery and lacking in nutrition. It is also modified by the character of the food, drink or drugs taken by the mother or wet-nurse, or by her habits. The woman should be carefully examined physically and in some cases it may be advisable to subject samples of the milk to chemical tests. Average breast milk has about the following composition: Fat, 4 per cent; sugar, 7 per cent; proteid, 2 per cent.

During the first two or three days after the child's birth the diet should be light, largely liquid. The bowels may often be moved by adding fresh or stewed fruits or buttermilk to the diet; if these fail, give castor oil if the milk if scanty, or a saline cathartic if it is too abundant. The quality and quantity of the milk may be modified by the woman's diet. To increase the quantity, give large quantities of fluid, especially milk and meat foods. To increase the solids give less fluid, more solids. If more proteids are desired, decrease the exercise; if more fats, increase the proportion of meat. Beer and ale should not be given unless the woman is accustomed to their use.

If, in spite of all that can be done, the child is still insufficiently nourished, the breast milk should be supplemented in part by other food. Milk and its modifications, as hereafter described are to be employed for this purpose.

Artificial Feeding.

Cow's milk is the best substitute for the mother's milk. It is of the utmost importance to get a good quality from a reliable source. Fortunately, with the increasing attention given to this subject, and greater care in the inspection of cattle and milk, this is becoming less difficult every year, even in large cities. If good, clean, and absolutely fresh milk can be secured, pasteurization and sterilization

become unnecessary. Heating milk undoubtedly makes it less digestible and predisposes to the occurrence of scurvy, rickets and other nutritional disorders.

The cows from which milk is procured should be healthy animals, proven to be free from tuberculosis by the tuberculin test, and neither very young nor very old. The milk from several animals is to be preferred to that taken from one cow, since there are decided variations in quality from one day to another, and even during the day, which may be dangerous to the child.

The utmost cleanliness in the dairy should be insisted upon. The cow's udder and teats should be bathed before milking and the milker's hands and the pails used to collect the milk should be as clean as possible. Milk should not be allowed to stand in the stable, since it quickly absorbs odors and is likely to be contaminated with bacteria. It should be immediately cooled to 60 deg. F., and kept below that temperature until ready for use. It should be bottled in the dairy instead of shipping it into the city in cars and bottling then.

If the quality of the milk is doubtful, it should be pasteurized (heated to 160 to 170 deg. F.) or sterilized (heated to 212 deg. F. —the boiling point). This may be done in patent sterilizers or by placing the bottles, plugged with absorbent cotton, in a pan of water and raising the temperature to the desired point.

Modification of Milk.—Cow's milk contains about twice as much proteid as mother's milk; moreover, this tends to form hard curds instead of the firm, more flaky curds of breast milk. According to Baginsky, cow's milk contains on an average 3.65 per cent proteid, 3.11 per cent fat, and 4.54 per cent milk-sugar. For convenience we may say that there is approximately 4 per cent of each of these ingredients. In modifying cow's milk, therefore, we dilute it so as to reduce the percentage of proteid and maintain the percentage of fats and sugar. This is most conveniently done by using top-milk or cream, which is richer in fat, and adding milk-sugar or cane-sugar. Various elaborate systems or plans have been suggested to get the correct proportions, but these are seldom necessary. The top milk of a quart of average milk containing 4 per cent of fat, if allowed to stand six or eight hours, contains the following proportions of fat and proteid (Crandall):

7 ounces top milk contain 16 per cent fat, 4 per cent proteid.
8 ounces top milk contain 14 per cent fat, 4 per cent proteid.
9 ounces top milk contain 12 per cent fat, 4 per cent proteid.
11 ounces top milk contain 10 per cent fat, 4 per cent proteid.
15 ounces top milk contain 8 per cent fat, 4 per cent proteid.
20 ounces top milk contain 6 per cent fat, 4 per cent proteid.

"These top milks simply require diluting three to ten times. When the milk is to be well diluted, the top nine ounces are commonly required; as the dilution is reduced, twelve to fifteen ounces.

"For example, dilute nine-ounce top milk to one-fourth, and we have 3 per cent fat and 1 per cent proteid. Dilute fifteen-ounce milk to one-half, and we have 4 per cent fat and 2 per cent proteid. For a young infant, dilute nine-ounce top milk eight times and we have 1.5 per cent fat and .5 per cent proteid. With the same dilution, if we take off two ounces less (seven-ounce top milk), we have 2 per cent fat and the same proteid. Take two ounces more (eleven-ounce top milk), and we have 1.25 per cent fat and the same proteid. We thus regulate the proteid by diluting; the fat, by the amount taken from the top.

"Simply divide the figures of this table by the number of times the milk is diluted and the percentages of fat and proteid in the mixture are known. The claim is not made that this will result in the same absolute percentages with every milk. No modification can possibly do that, unless the quality of the milk is known. It will, however, be as accurate as any other method of home modification and will be sufficiently close for ordinary cases."—(Crandall.)

The simplest way to obtain the top milk is to syphon off the underlying milk. A bent glass tube, filled with water, one end being placed in the bottom of the bottle and the other hanging down on the outside, answers every purpose. The syphoning may be stopped at any point. The tube should, of course, be kept scrupulously clean. The mixture is sweetened by the addition of milk-sugar. Usually one ounce of sugar added to twenty ounces of the mixture will bring the quantity to the normal one of 6 or 7 per cent. Cane-sugar may be used in half this quantity. Jacobi prefers it and it will sometimes relieve constipation.

The diluent is usually plain boiled water. Chapin prefers dextrinized wheat, barley or oatmeal gruel. "A heaping tablespoonful of flour, made from a cereal, is boiled with about a pint and a half of water for fifteen minutes. It is then removed from the stove and set in cold water for about three minutes to cool it. When it is sufficiently cool to taste, a teaspoonful of a preparation of diastase is added, which renders the gruel thin and watery. This makes about a pint of gruel, containing the starches in soluble form, while the cellulose or skeleton of the cereal acts as a most sufficient attenuant of the curd. The digested gruels render the milk-curd porous, and also provoke the secretion of the digestive juices." The mixture may be alkalinized by the addition of lime water or sodium bicarbonate.

Holt divides the fifteen months of healthy infancy into three periods: "The first is from birth to end of the third or fourth month, when the fat should be three times the proteids. The second, from the fourth to the end of the tenth month, when the fat is twice the proteids. The third, from the end of the tenth to the beginning of the fifteenth month. The proteids now are increased until they are nearly equal to the fat as in whole milk."

The quantity and dilution of the milk during the nursing period is shown by the following table, taken from Fischer:

1—2 mos., 2 ozs.: 1-4 milk, 3-4 water; feed every 2 hrs.
2—4 mos., 3 ozs.: 2-4 milk, 2-4 water; feed every 2 hrs.
4—6 mos., 4-6 ozs.: 3-4 milk, 1-4 water; feed every 3 hrs.
6—8 mos., 6-8 ozs.: 4-4 milk, no water; feed every 3 or 4 hrs.

No absolute rules can be made as to the character, proportions of the ingredients or quantity of the milk mixture to be used. These are determined by a study of the child and its nutrition. Fischer says we should note the following factors, in order to know that the child is thriving: "(1) The infant must appear satisfied after taking its bottle. (2) There should be no vomiting. (3) There should be no colic. (4) The bowels must move unaided at least once or twice in twenty-four hours, depending upon the age of the infant —the stool should be yellowish-white and of a medium soft consistency. (5) The infant should sleep from four to eight hours at one time during the night. (6) The weight must be taken regularly once a week, and if an infant thrives it should gain at least six to eight ounces every week. (7) When a child's weight shows no increase, the reason should be studied, and by all means the food changed, for the infant requires more substantial nourishment."

If there are curds in the stools, there is too large a percentage of proteid in the food, and it should be farther diluted; if the child does not increase in weight and is poorly nourished, increase the proteid.

Too much fat may cause indigestion or vomiting. If there is too little, there may be constipation. Constipation may be relieved by adding more fats or using cane-sugar instead of milk-sugar.

Excess of sugar causes colic, formation of gas and diarrhea, with acid, greenish stools.

Other Milk Substitutes.—In some cases excellent results are obtained by using the artificially prepared infant foods as additions to the other food. These for the most part consist of mixtures of the dextrinized grains with milk or other albuminoid substances. They should seldom be depended on alone in infant feeding. Palatable mixtures may be made with cow's milk. Condensed milk is not a suitable food to be depended upon. These foods, if used alone, predispose to nutritional diseases, such as scurvy, rickets, etc.

A useful home-made dextrinized food is the "flour-ball," which is made as follows: "Plain wheat-flour is boiled in a bag for five hours, then dried, broken open, the rind rejected, and then grated into a powder. I take of pure milk, mixed and scalded, one pint; of sterile water, one pint; of the boiled flour, a heaping tablespoonful; a bit of cinnamon bark (sometimes to give some flavor with certain children), and a pinch of common table salt. The milk is placed on the fire and heated; the flour is rubbed to a fine paste with the water, and then added to the milk. The cinnamon is added, and

then it is brought to the boiling point, taken from the fire, the salt added (not sufficient to taste), and the whole is then placed on the ice. It is then heated again when used. Two ounces every two hours are given to a child one month old. It is increased one-half ounce every month, while the water is reduced one ounce every month. The milk is added to keep the quantity up to the two pints."

RECTAL INJECTIONS AND LAVAGE—ENEMATA.

An enema is a fluid injected into the rectum for the production of a local or general effect. It may be used (1) to empty or flush the bowel; (2) as a vehicle for drugs intended to act directly upon the mucosa; (3) as a vermifuge; (4) to overcome temporary obstruction of the bowel; (5) as a nutrient; (6) for absorption, in cases of shock and toxic conditions, in order to fill the vessels, promote elimination and stimulate reaction; (7) for the thermic effect.

Purgative enemata are given to empty the bowels. Simple warm water may be used, but usually substances are added to increase their efficiency. Among these substances are soap made into a "suds" or lather, common salt, olive oil, castor oil, glycerin, turpentine, Epsom salts, molasses, etc. Hanna Kindborn gives the following formulas for purgative enemas in the "Trained Nurse":

Turpentine	oz ½
Magnesium sulphate	oz. 1
Castor oil	oz. 1
Warm water	pint 1

and

Ox-gall	gr. 15
Turpentine	oz. ½
Glycerin	oz. 1
Castor oil	oz. 1
Soap-suds	pint 1

The ox-gall should first be dissolved in warm water.

A formula recommended for a high enema by Stoney (Bacteriological and Surgical Technique for Nurses) contains:

Senna	oz. ½
Magnesium sulphate	oz. ½
Olive oil	oz. 1
Boiling water	pint 1

Infuse the senna in the water. Then dissolve the magnesia, add the oil and thoroughly mix by stirring.

If there is tympanites a little turpentine (dr. 2 to 4) may be added. The author mentioned above recommends:

Tinct. asafetida	oz. 2
Spt. turpentine	oz. 1
Magnesium sulphate	oz. 2
Warm water	pint 1

Olive oil was recommended by Kussmoul and Fleiner in ob-

stinate constipation. About a pint of the warm oil is introduced at night and retained until morning, if possible. This serves to soften hardened feces. Simple enemata of olive oil are useful to move the bowels of children. Pure glycerin, ¼ to 1 ounce, injected into the bowel with a small syringe will often produce a free and prompt movement.

In giving purgative enemata the patient should lie, by preference, on the left side (Sims' position) with the hips slightly elevated. The fluid should be warmed to the temperature of the body, only 1 to 3 pints being used. It may be introduced through a Davidson, or, better, a fountain syringe.

High Enemas.—In some cases it is desirable to irrigate the colon throughout its entire length. Then a long rectal tube should be introduced, the water being allowed to run as it enters the rectum so as to balloon it out and facilitate its passage. The dorsal position may be more convenient in these cases. A return flow tube is most convenient for irrigating the colon, but is not absolutely essential. Purgative enemata should be retained a few minutes. This is facilitated by pressing the buttocks together after sufficient fluid has entered the rectum and the syringe nozzle has been withdrawn.

Local Application.—Many drugs are applied to the inflamed intestinal surfaces by means of enemas. Nitrate of silver, 5 grains to the ounce, is a favorite in cases of rectal erosion or ulceration. Antiseptics, as boric acid, bichlorid of mercury, potassium permanganate, etc., are frequently used if the rectum or colon is inflamed or ulcerated. Astringents may also be employed. Tannic acid (dram to the pint) and zinc sulphocarbolate (15 grains to the quart) are excellent in dysentery. Cantani used tannic acid in cholera with excellent results, in the following formula:

Infus. chamomile-flowers	parts	2000
Tannic acid	parts	10
Gum arabic	parts	30
Tinct. opium	parts	2

The laudanum and starch-water enema is a favorite in dysentery. In the gastro-enteritis of children irrigation with boric acid or normal salt solution is one of the best remedies.

Rectal injections of salt-water, turpentine (½ ounce in emulsion with yolk of egg in ½ pint of water) and infusion of quassia are useful in case of seat-worms.

Nutrient enemata are employed when for any reason feeding by the stomach must be suspended wholly or in part. Such cases are gastric ulcer, cancer of the stomach, obstruction of the esophagus or pylorus and intractable vomiting. Before giving food by the rectum a cleansing injection should be used. A fountain syringe or fountain-tube should be used and the tube carried high up, 12 to 18 inches, into the colon. The injection is best made with the pa-

tient in Sims' position and the fluid should be allowed to run in very slowly. Four to 8 ounces of the food is sufficient for one injection. Four or more feedings may be given daily. Since, after using the enemata a number of times, the bowels often become irritable, it is often necessary to add 10 to 20 drops of laudanum for its sedative effect. After the rectal feeding the patient should remain quiet in bed for an hour. A warm towel held against the anus for a few minutes makes the retention of the food less difficult.

Milk is the basis of most nutrient enemas. It should always be pancreatinized (see Diet for the Sick) before using. Pancreatinized milk-gruel, eggs, beef-juice, peptone and various proprietary proteid foods, such as beef-peptonoids, somatose, protose, Wyeth's beef-juice, bovinine, etc., are much employed. A mixture of pancreatinized milk, eggs and beef-juice makes a satisfactory food. Somatose (1 or 2 drams) is an excellent addition to a milk mixture. Any of the meat broths may be used and, if desired, these may be pancreatinized, or peptonized, by the addition of a little pepsin and HCl. Table-salt should always be added to egg enemas since it increases absorption. Stimulants, as whiskey, brandy, black-coffee, digitalis, etc., may be added to the enema if required.

Thermic Effect. — Cold water (60° to 90° F.) is used to reduce the temperature in cases of thermic fever, dysentery, etc. Small quantities are used (1 pint to 2 quarts), the temperature of the water being suited to the degree of fever or the condition of the patient. In nervous or debilitated patients or sensitive children it is better to commence with the higher temperature and gradually reduce it. Cold water is also used in case of hemorrhage; hot water (110° to 120° F.) is also used for the same purpose. Hot water irrigations are used to modify local or adjacent inflammations, as in prostatitis or cystitis; in women it may be substituted for the hot vaginal douche.

Enteroclysis.—Hot saline solutions are often introduced into the rectum for the relief of shock or for the stimulation of renal excretion. See below.

ENTEROCLYSIS AND HYPODERMOCLYSIS.

Enteroclysis consists in the introduction of fluid into the bowel. Hypodermoclysis is the subcutaneous injection of fluid in considerable quantity. The fluid usually used for both these purposes is decinormal salt solution having a strength of 0.6 per cent of sodium chlorid (about 45 grains to the pint). For practical purposes a teaspoonful of common table-salt to a quart of boiled water answers every purpose. This salt solution, given hot, is used either by enteroclysis or hypodermoclysis for the following purposes: (1) To cause reaction in case of shock; (2) to replace the

circulating fluid lost in severe hemorrhages; (3) to stimulate renal excretion in case of suppression or insufficiency of the urine, in uremia, etc.; (4) to dilute the toxins in the blood and stimulate their excretion by the kidney, skin, etc., in the toxemic diseases, as septicemia, diphtheria, pneumonia, etc.

In addition to the decinormal saline solution various substitutes have been suggested. That of Hoyem contains:

Sodium sulphate	Gm.	10.0
Sodium chlorid	Gm.	5.0
Distilled water	Cc.	1000.0

Hare recommends:

Calcium chlorid	Gm.	0.25
Potassium chlorid	Gm.	0.1
Sodium chlorid	Gm.	9.0
Sterilized water	Cc.	1000.0

In either enteroclysis or hypodermoclysis the temperature of the fluid should be high (105° to 120° F.). It should be remembered that it cools rapidly in passing through a long rubber-tube. It should enter the body at a temperature of 102° to 105° F. If allowed to become lukewarm the water has a relaxant effect instead of the stimulating one desired. In shock it is very important that it be hot. The technique of enteroclysis is the same as that of high irrigation and needs no further description. In hypodermoclysis a fountain syringe connected by a rubber-tube with an aspirating-needle of moderate size is all the apparatus necessary. Everything used should be sterile and the site of injection should be made aseptic by careful scrubbing. A site should be chosen where the tissues are not too firm and sufficiently rich in blood-vessels to favor rapid absorption. Usually the breast, abdomen, back, thigh or axillary space is selected. Kemp recommends the loin—the space between the crest of the ilium and the ribs—the "ileo-lumbar" region. Too much fluid should not be used at a time, since by distending the tissues it may hinder absorption and too much cannot be excreted by the kidneys. Hildebrand says that a dram of the saline solution to every pound of the person's weight should be the maximum quantity introduced every fifteen minutes; if the patient weighs 100 pounds, 12½ ounces can be disposed of every fifteen minutes. The operation may be repeated at short intervals. For instance, 6 to 8 ounces may be given every hour or two if necessary.

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